Permaflectors

The silver-plated glass reflectors with the PERMANENT reflecting surface

MADE ONLY BY

LOCAL REPRESENTATIVE

Pittsburgh Reflector Co.

304 ROSS STREET - PITTSBURGH, PA.

New York City: General Motors Building
Chicago: Merchandise Mart

Crystal Glass, made in our own factory that we may control every step of the process. Result—clear, sparkling, uniform.

Pure silver, double plated—the surface that reflects light with least loss by absorption.

Copper envelope—seals the silver between glass on the one side and copper on the other. Like a copper roof it is a lifetime protection.

Silver colored satin finish—distinctive, handsome, harmonizes with all backgrounds.

Outstanding Distinctive Features of Pittsburgh Permaflectors

The complete Permaflector — the glassware as well as the application of the reflecting surface and protective finish — is made in the Pittsburgh Reflector Company's own plant under the closest supervision and inspection. Permaflectors are unconditionally guaranteed for ten (10) years. The illustrations above show clearly the four major steps in the process of manufacture.

1. The Glassware — Permaflector glassware is of the highest quality of tough, accurately-blown, clear crystal glass.

2. The Reflecting Surface — Silver-plating on the outside of the glass — for commercial uses, the most efficient reflecting surface yet produced — when protected by the Pittsburgh method it retains permanently its original bright luster.

3. The Copper Protecting Coat — Over the silver-plated reflecting surface is applied, by an exclusive secret process, a thin tough sheet of copper. This permanently seals the silver and protects it from abrasion and positively prevents tarnishing, discoloration, checking and peeling.

4. The Satin Silver Finish — Over the copper protective surface is applied a satin silver finish, attractive and distinctive — a finish of neutral tone which harmonizes admirably with all surrounding materials and fitments.

Continued on next page

PITTSBURGH REFLECTOR COMPANY

Manufacturers of Permaflector Silvered Glass Reflectors

304 Ross Street, PITTSBURGH, PA.

BRANCHES

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CHICAGO, ILL., J. J. KIRK, Manager, 1157-8-9 Merchandise Mart—Telephone, Superior 0970

FACTORY REPRESENTATIVES

ATLANTA, GA., WHITMAN & KETHLEY, Bona Allen Building
BALTIMORE, MD., W. B. MASLAND CO., 105 E. Franklin Street
BOSTON, MASS., DETWEILER-BELL CO., 101 Milk Street
BUFFALO, N. Y., H. H. MALLON, 350 S. Elmwood Avenue
CINCINNATI, OHIO, H. C. KING, 622 Broadway
CLEVELAND, OHIO, HANDEL-DAVIES CO., 202 Chester-Twelfth Building
DALLAS, TEX., THE LIGHTING AND SPECIALTY CO., 2205 Leonard Street
DENVER, COLO., WESCO CO., 7th and Lawrence Streets
DETROIT, MICH., JAMES D. CARR, 141 E. Elizabeth Street
INDIANAPOLIS, IND., SCOTT-JAQUA CO., 202 Indiana Terminal Warehouse, 31 E. Georgia Street
KANSAS CITY, MO., MERVIN SIMONS, Keystone Building, 1320 Main Street
LOS ANGELES, CALIF., FRANK E. HASTINGS, 201 Transportation Building, 7th and Los Angeles Streets
LOUISVILLE, KY., NICHOLSON ELECTRICAL SALES, 214 Keller Building
MILWAUKEE, WIS., A. J. SINGER, 315 National Avenue
PHILADELPHIA, PA., HOPKIN BROS., INC., 235 S. 8th Street
SALT LAKE CITY, UTAH, RAYMOND ACKERMAN, 318 Dooly Block
SEATTLE, WASH., L. D. MORGAN, 240 Securities Building
ST. LOUIS, MO., GEO. H. WACKER CO., 2647 Washington Boulevard
ST. PAUL, MINN., C. O. KINDY, 1236 Lincoln Avenue

Products

"PITTSBURGH" PERMAFLECTOR SILVERED GLASS REFLECTORS, in more than 50 different designs and shapes.

Adaptability

Adapted to every economic illumination need. Reference to the index below gives the major specific uses.

The Company—Its Experience and Facilities

More than two decades of continuous successful specialization in the development, manufacture and application of this product. All Permaflector units, including glassware, are made in our own factory under experienced supervision. Every step in the manufacturing processes is constantly under our control. Rigid inspection is complete assurance that only perfect units which will fulfill our guarantee are merchandised.

Complete stocks of Permaflectors are available at all branch offices for immediate local delivery. Adequate factory warehouse stocks of all standard products are maintained for prompt, one-day shipping service.

The Fourteen Year Record

That "Pittsburgh" Permaflectors invariably stay bright is proven by the history of the past 14 years. Although the heat of the Type "C" lamp places great stress and strain upon the reflecting surface and the reflector backing, Permaflectors have successfully passed every test—the heat test in the laboratory, the heat test in the baking ovens after the finish is applied (350 degrees for four hours) and last, but by no means least, the actual practical test in scores of thousands of installations throughout the world.

Not even 1/1000 of 1 per cent—not even one in 100,000 of all the "Pittsburgh" reflectors made since August 1st, 1916—has ever been reported as having the backing crack, check or peel or the silver reflecting surface tarnish or darken.

Guarantee

We unconditionally guarantee that the backing of "Pittsburgh" Permaflector Silvered Glass Reflectors will not crack, check or peel and that the silver reflecting surface will not tarnish for a period of 10 years from the date of purchase.

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Engineering Service

For more than two decades we have specialized in the lighting of show windows and in other fields of special illumination. During this varied experience we have accumulated a fund of information valuable in the solution of illumination problems. This information is available, without obligation, for the solution of all problems relating to the lighting of show windows, color lighting, spot lighting, foot lighting, indirect cove lighting for theaters, churches, libraries, courtrooms and other public buildings as well as homes, direct and indirect lighting, industrial lighting, lighting through skylights, outdoor floodlighting, etc.

Our experienced corps of illuminating engineers are constantly available to the architect for prompt and comprehensive service.

Scope of This Catalogue

This catalogue contains complete, detailed information for the convenience of the architect on all the standard products of the Pittsburgh Reflector Company. On preceding page is a complete index of subject matter and units. Page numbers both in the index and in cross references refer to Permaflector page numbers as given at the bottom of each page. To secure the most practical and economical results we strongly recommend consultation with our branch offices, particularly at the time plans and specifications are in the course of preparation.

Other Publications

Other publications of this company, sent free to any architect on request, are described on Permaflector Page 48.

The Fundamentals of Good Lighting

Good lighting (efficient illumination) is dependent on five basic elements, namely:

(1) Proper size and type of lamps;
(2) Proper location and spacing of units;
(3) Permanent effectiveness of the reflector;
(4) Proper design or shape of the reflector;
(5) Correct installation of the lighting unit.

Varying requirements of application and intensity create problems often difficult of solution. Obviously the type of reflector is of paramount importance if permanence of effectiveness and maximum economy are to be maintained.

Reflectors—Technical Information

Reflecting surfaces are divided into two major classes—the diffuse and the specular.

The diffuse reflecting surface, typified by the familiar porcelain or white enamel, or stippled surfaces, simply spreads or scatters the light in many directions, without accurate control.

Specular reflectors not only reflect light, but control it accurately—direct the light where it is wanted—and thus minimize the waste of electric current.

Some light is lost by absorption whenever it falls upon any kind of a surface, just as some water is lost by absorption when it falls upon even a hard surface, such as a concrete road.

But it is well known to engineers, as well as to the science of optics, that silver plated glass absorbs less light than any other kind of a surface which it is practicable to use for commercial reflectors.

A polished silver surface has a very high "reflecting coefficient"—about 95%. That is, it reflects or returns all but about 5% of the light it receives.

But unprotected silver tarnishes quickly—darkens and loses its reflecting power—and so cannot be used.

When silver is protected by glass, as in the case of mirrors, the silver surface itself has a coefficient as high as 92%.

The coefficient for silver plated glass is reduced to perhaps 87% by the absorption of some of the light in passing through the glass itself.

A polished silver surface can be protected with lacquer—due to its cheapness this has been tried as a substitute for glass. But though the lacquer is apparently transparent when new, it has been found that the reflecting coefficient of the lacquer-protected silver, even when new, is only about 75%. Moreover, the lacquer is easily scratched. But the serious objection to it is that lacquer darkens with time, eventually reducing the coefficient to less than half its original value.

Freshly polished nickel has a coefficient of 60%, falling off rapidly by tarnishing.

For ready comparison, we give the established coefficients of reflection of various surfaces, in tabular form.

Approximate Coefficients of Reflection

Polished silver, unprotected, new, darkens rapidly	95%
Silver surface, plated on glass	92%
Silver plated glass	87%
Silver surface lacquered, new	75%
Silver surface lacquered, old, as low as	35%
Nickel, freshly polished, tarnishes rapidly	60%
Aluminum and aluminum alloys, less than	60%
Stainless steel, not over	40%
Chromium, not over	65%

From this engineering data—the particular efficiency and adaptability as a reflecting surface of silver plated glass is established.

It is not sufficient, however, to select any silver plated glass reflector. Unless the silver plating is properly protected, the silvered reflecting surface will gradually deteriorate until it has no more value than aluminum, stainless steel, or other similar surface.

There is *one* silvered glass reflector which *does stay bright*—the reflecting surface of which does not tarnish or discolor.

Permaflectors stay bright—at the end of longest periods of observation (14 years) the reflecting surface has proven to be just as bright, just as efficient, as when they were first installed.

Permaflectors—An Economic Achievement

Description—Permaflectors are the silver-plated glass reflectors with the permanent reflecting surface, made only by Pittsburgh Reflector Company.

We have now completed 14 years of a remarkable manufacturing record. Although "Pittsburgh" Permaflectors are unconditionally guaranteed for ten years against the common faults of silvered glass reflectors, of all the "Pittsburgh" reflectors made since we began using our secret coppering process on August 1st, 1916—not even one in one hundred thousand has ever been reported to us as defective.

When Type "C" lamps came on the market in 1915, trouble began for manufacturers of silvered glass reflectors. The greater heat of the new lamp caused the backing to crack, check or peel and the silvered reflecting surface to tarnish or darken.

After a long series of experiments we perfected a process which we have thus far kept secret, whereby we lay a thin sheet of copper over the silver plating. This seals the silver between the glass and the copper.

It is permanent—the silver stays bright!

Economical—It is not sufficient that a reflector

Continued on next page

installation be efficient when first installed. Initial effectiveness of lighting is important, of course, but it is of the utmost importance that this efficiency be maintained.

Reflectors which turn dark from the heat of the lamp are worthless; and replacements, even if without charge for the new reflectors, in no way indemnify the user for the waste of electric current for which he pays, but which is not converted into useful lighting; nor does replacement compensate for sales lost by reason of the decreased lighting.

Darkening of the reflecting surface can easily lessen the output of light from reflectors 10%, 20% and in extreme cases even 30% to 50%. This may amount to two or three dollars—even four or five dollars per year per lamp—from which nothing whatever is received in return. But most important to many—deterioration in lighting lessens sales and cuts down profits.

Not only is the "Pittsburgh" ten-year guarantee an agreement to replace any goods of defective manufacture—but this thirteen-year history of perfection in manufacture is assurance that replacements will not be needed; that the initial lighting satisfaction will be fully maintained throughout a period of a great many years and that the lighting installation will cost the user least per year.

Distinctive Finish—"Pittsburgh" Permaflectors have always been distinctly superior in efficiency, in brilliance and permanence of the reflecting surface, in durability of the backing and assurance against need of replacement. They are equally distinctive in appearance. The silver color satin finish has many advantages both to the user and to the trade.

This silver color makes the reflector less conspicuous when not concealed by valance or sign; it harmonizes more universally with the variety of colors found in show window ceilings and backgrounds; it is suggestive of light, silver and glass; and unlike the enamel heretofore used for reflector backing, this silver color will not darken under the heat of the Type "C" lamp.

A Complete Line—The Permaflector line includes more than 50 different designs—a correctly shaped unit for practically every need in the lighting of show windows, cove lighting, direct and indirect lighting, flood-lighting and color lighting. There is scarcely any lighting problem which Permaflectors will not help solve.

For Show Windows

Where our Engineering Department can be of assistance, the following data are required:

A rough pencil sketch of the floor plan of the windows to be lighted, marking on the sketch (a) length of the glass; (b) distance from glass to background; (c) from floor to ceiling; (d) from floor to transom bar; (e) height of background; (f) state nature of the display.

Lighting of Transparent Sign and Display Through Use of Permaflector No. 102

For ready reference, particularly for the simpler jobs, the table given on Permaflector Page 7 will be found helpful in the selection of the right type of Permaflectors.

For Lighting Transparent Sign and Display

Permaflector No. 102 and 112 (Page 12) is designed specifically for the lighting both of a transparent sign or valance and of the window display. This remarkable reflector satisfactorily lights many windows, such as in drug stores and cigar stores, in which heretofore the lighting of the display has been sacrificed in order to light the transparent sign or valance.

For Cove Lighting

Where our Engineering Department can be of assistance, the following data are required:

Room sizes and cross-section details; or state size of room, height of ceiling, distance from floor to cove and from cove to ceiling. The shape and size of the cove is of the utmost importance—we will be glad to assist in establishing its most effective size and shape.

Permaflector Cove Lighting

Daylight Reflections

The most difficult problem in show window lighting is perhaps that of daylight reflections. There are many windows where such reflections may be noted. In exceptional cases, such reflections may be so great that displays cannot be seen under ordinary window lighting in daytime.

Although it is impracticable to overcome the worst of such reflections entirely by means of artificial lighting, the reflections can be lessened to a great extent by means of increased intensities; by color lighting, by use of the right backgrounds; and by awnings.

Ofttimes a change in the color of the background in the show window will accomplish a great deal. The darker the background the more the plate glass becomes like a mirror; the lighter the background the less apparent are the reflections.

Use of an awning or marquise is frequently of great help, and color lighting quite often proves effective in lessening objectionable reflections, particularly the use of the amber color.

It is important, therefore, to reduce the objectionable reflections as much as possible by means of light-colored backgrounds, awnings and color lighting in order that the intensity of artificial lighting required be kept to a practicable wattage.

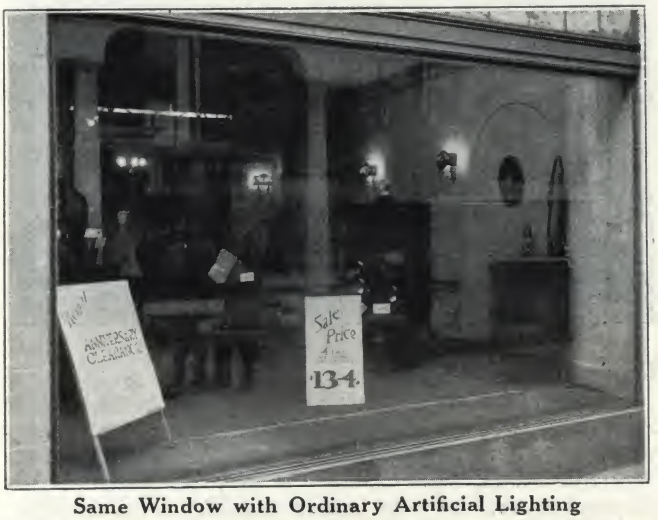
Continued on next page

Flexible Lighting

Where it is necessary to use high wattage to overcome daylight reflections, it may be better to use flexible lighting rather than the 500 watt reflectors. Large windows, of course, are the exception to this rule.

By flexible lighting, we mean an installation of "Pittsburgh" Permaflectors in two, or three, rows on close centers, each row wired alternately on two circuits, using 100, 150 or 200 watt lamps, usually supplemented by Windo-Spots or Windo-Floods.

Daytime Reflections in an Unlighted Show Window

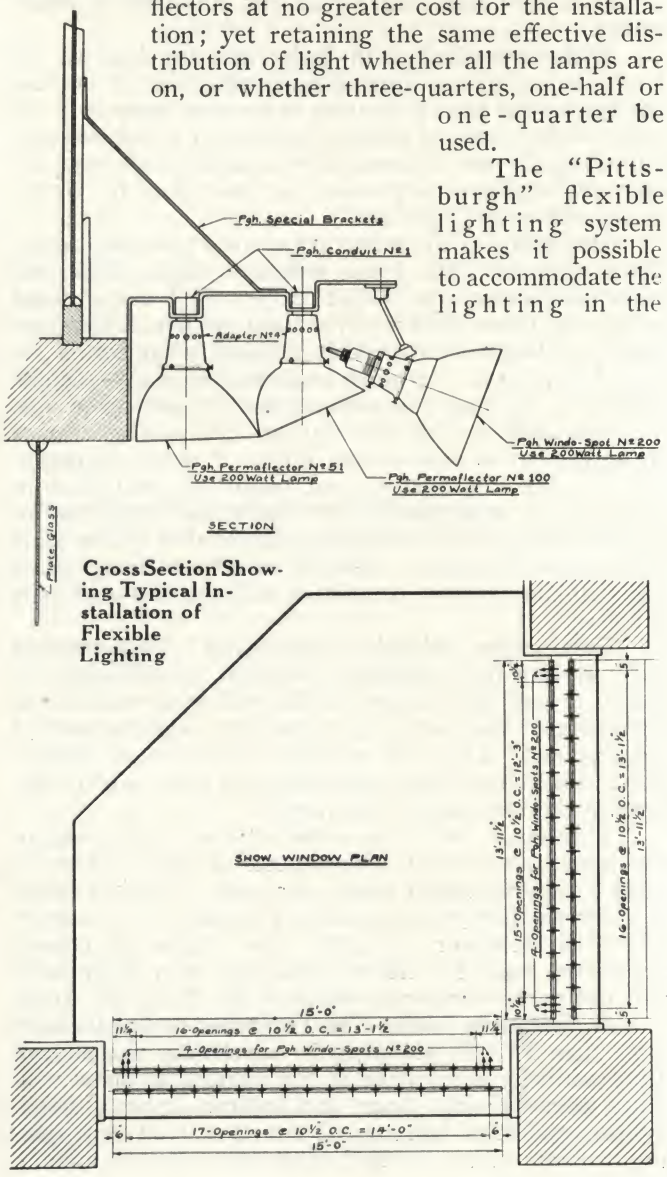


Same Window with Ordinary Artificial Lighting

And the Same Window with "Pittsburgh" Flexible Lighting—Reflections Almost Entirely Eliminated

With the "Pittsburgh" flexible lighting almost as much wattage can be used as with the 500 watt reflectors at no greater cost for the installation; yet retaining the same effective distribution of light whether all the lamps are on, or whether three-quarters, one-half or one-quarter be used.

The "Pittsburgh" flexible lighting system makes it possible to accommodate the lighting in the windows to meet the varying conditions of the day and of the season—five or more levels of illumination are available at the touch of a switch.



Cross Section Showing Typical Installation of Flexible Lighting

By using half the reflectors in one row, a level of illumination may be had sufficient for window lighting at different times and under different conditions.

By using all the reflectors in one row the lighting is adequate for any window at night.

When higher levels of illumination are required, as during certain hours of the day, all lamps in one row and half in the second may be lighted; or all the lamps in both rows of reflectors; or all in both rows, together with one or more Windo-Spots, if maximum lighting is required.

These advantages of the flexible system of lighting are obvious.

Distribution Curves

The performance of each reflector is indicated by the light distribution curve. For window reflectors the full line curve gives distribution in the plane perpendicular to the plate glass, dotted curve is for the plane parallel with the glass.

Continued on next page

CHART FOR SELECTING PROPER PERMAFLECTORS FOR SHOW WINDOW LIGHTING

HEIGHT OF SOLID BACKGROUND — FEET

HEIGHT - FLOOR TO PERMAFLECTORS - FEET	DEPTH - GLASS TO BACKGROUND - FEET	1	2	3	4	5	6	7	8	9	10	12	14	16
4	1	C-100	C-100	55	110									
4	2	55	55	110	110									
4	3	55	55	110	110									
4	4	55	110	110	110									
5	1	C-100	C-100	55	55	110								
5	2	C-100	55	55	110	110								
5	3	55	55	55	110	110								
5	4	55	55	110	110	110								
5	5	55	55	110	110	110								
6	1	C-100	C-100	C-100	55	55	110							
6	2	C-100	C-100	55	55	110	110							
6	3	C-100	55	55	55	110	110							
6	4	55	55	55	110	110	110							
6	5	55	55	55	110	110	110							
6	6	55	55	110	110	110	110							
7	1	C-100	C-100	C-100	52-55	52-55	52-55	100-110						
7	2	C-100	C-100	52-55	52-55	52-55	100-110	100-110						
7	3	C-100	52-55	52-55	52-55	52-55	100-110	100-110						
7	5	52-55	52-55	52-55	52-55	52-55	100-110	100-110						
7	7	52-55	52-55	100-110	100-110	100-110	100-110	100-110						
8	1	C-100	C-100	C-100	C-100	52-55	52-55	52-55	100-110					
8	2	C-100	C-100	C-100	52-55	52-55	52-55	100-110	100-110					
8	4	52-55	52-55	52-55	52-55	52-55	100-110	100-110	100-110					
8	6	52-55	52-55	52-55	52-55	100-110	100-110	100-110	100-110					
8	8	52-55	52-55	52-55	100-110	100-110	100-110	100-110	100-110					
9	1	C-100	C-100	C-100	C-100	52-55	52-55	52-55	52-55	100-110				
9	2	C-100	C-100	C-100	52-55	52-55	52-55	52-55	52-55	100-110				
9	3	C-100	C-100	52-55	52-55	52-55	52-55	52-55	100-110	100-110				
9	5	52-55	52-55	52-55	52-55	52-55	52-55	100-110	100-110	100-110				
9	7	52-55	52-55	52-55	52-55	100-110	100-110	100-110	100-110	100-110				
9	9	52-55	52-55	52-55	100-110	100-110	100-110	100-110	100-110	100-110				
10	1	C-200	C-200	C-200	C-200	52	52	52	52	52	100			
10	2	C-200	C-200	C-200	52	52	52	52	52	100	100			
10	4	C-200	C-200	52	52	52	52	52	100	100	100			
10	6	52	52	52	52	52	52	100	100	100	100			
10	8	52	52	52	52	52	100	100	100	100	100			
10	10	52	52	52	100	100	100	100	100	100	100			
12	4			551-555	551-555	551-555	551-555	551-555	551-555	551-555	500	500		
12	6			551-555	551-555	551-555	551-555	551-555	551-555	500	500	500		
12	8			551-555	551-555	551-555	551-555	551-555	500	500	500	500		
12	10			551-555	551-555	551-555	551-555	500	500	500	500	500		
12	12			551-555	551-555	551-555	500	500	500	500	500	500		
14	4				551-555	551-555	551-555	551-555	551-555	551-555	551-555	551-555	500	
14	6				551-555	551-555	551-555	551-555	551-555	551-555	551-555	500	500	
14	8				551-555	551-555	551-555	551-555	551-555	551-555	500	500	500	
14	10				551-555	551-555	551-555	551-555	551-555	500	500	500	500	
14	12				551-555	551-555	551-555	551-555	500	500	500	500	500	
14	14				551-555	551-555	500	500	500	500	500	500	500	
16	6					551-555	551-555	551-555	551-555	551-555	551-555	551-555	500	500
16	8					551-555	551-555	551-555	551-555	551-555	551-555	500	500	500
16	10					551-555	551-555	551-555	551-555	551-555	551-555	500	500	500
16	12					551-555	551-555	551-555	551-555	500	500	500	500	500
16	14					551-555	551-555	500	500	500	500	500	500	500
16	16					551-555	551-555	500	500	500	500	500	500	500

Example—Assume a window 8 ft. high (floor to Permaflectors), 6 ft. deep (glass to background), solid background 8 ft. high.

Referring to first column, find 8 ft. height and 6 ft. depth; then run across horizontally to column corresponding to 8 ft. solid background; either the 100 or the No. 110 Permaflector may be used. In general, for a window of these dimensions, it would be preferable to use No. 100 Permaflector as this permits the use of the 200-watt lamp. For selection of adapter required see Permaflector Page 20.

Space reflectors 10½ to 14 in. on centers for 200 watts and less; for 300 and 500 watts, space 14 to 18 in. on centers.

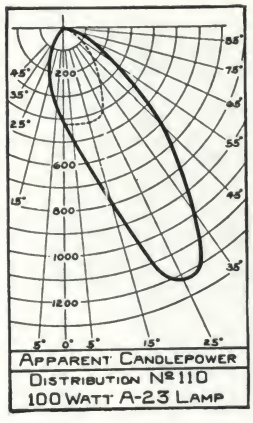
Continued on next page

Permaflector No. 110

Application—For low, deep show windows, 4 to 9 ft. high, in which trim is carried up to the level of the reflectors. In the plane perpendicular to the plate glass, it illuminates to 95 degrees above nadir on trim side.

Also for wall cases, interior bulletin boards, paintings, cove lighting in theaters, churches, etc.

Spacing—Usually spaced 12 in. on center; may be spaced as closely as 9 in. When so spaced, good distribution may be had with only every other unit burning. Should be wired with alternate outlets on separate circuits.



Flush Mounting Ring—(Permaflector Page 19.)

Color-Lighting — (See Permaflector Page 21. Color-Lite No. 5.)

Lamps — 100-watt, A-23 and 150-watt clear.

Holder—2¼ in. Form "O." (See Permaflector Page 20.)

Opening Circular Diameter—8½ in.

Dimensions—

Height with Adapter No. 1256, 150-watt position, 8 in.

Height with Adapter No. 1256, 100-watt position, 7¼ in.

Slope of Reflector opening, 25 degrees above horizontal.

Receptacles should be spaced 5½ in. to center from glass—minimum, 3½ in.

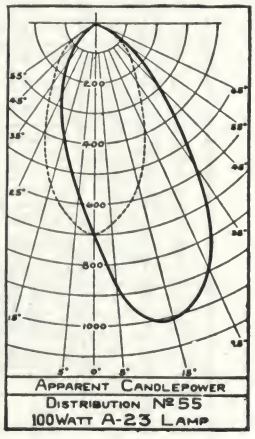
Permaflector No. 55

Application—For medium size shallow windows, 4 to 9 ft. high; medium high trim; island windows; or windows with upper part of background of glass. Concentrating; light cuts off between 65 and 70 degrees.

Exceptional concentration in the 5 to 35 degree angle, insuring effective illumination on the floor of the shallow window for which this reflector is intended.

Also for borders and strips on theater stages, indirect side wall urns and coves, side walls of galleries when placed over skylights.

Spacing—Usually 12 in. on center; may be spaced as closely as 9 in.



Flush Mounting Ring—(Permaflector Page 19.)

Color-Lighting — (See Permaflector Page 21. Color-Lite No. 5.)

Lamps—100-watt, A-23 (inside frosted) and 150-watt clear.

Holders—2¼ in. Form "O." (See Permaflector Page 20.)

Opening Circular Diameter—8½ in.

Receptacles—Should be 5½ in. to center, from glass—minimum, 3½ in.

Dimensions—

Height with Adapter No. 1256, 150-watt position, 6 1/8 in.

Height with Adapter No. 1256, 100-watt position, 5 1/8 in.

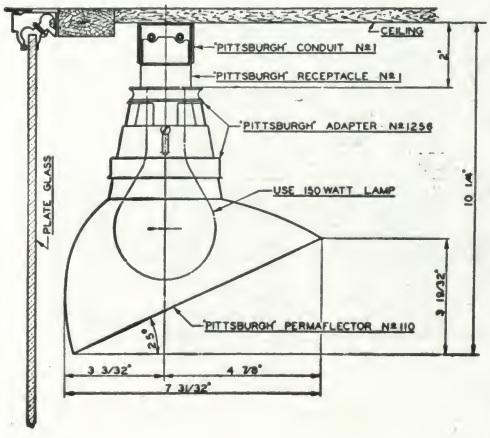
Lamps Recommended

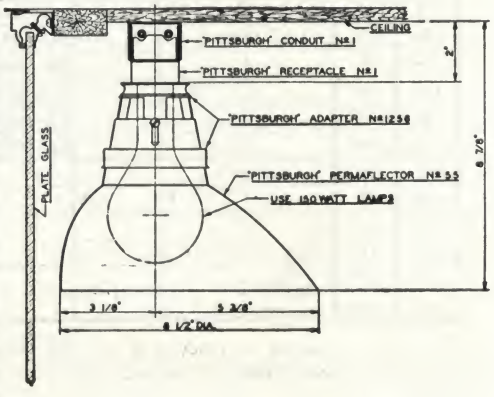
For side streets of small cities, 100-watt lamps on above spacings recommended; main streets of small cities, 150-watt lamps; side streets of large cities, 150-watt; main streets of large cities usually require the use of 200-watt lamps for which Permaflectors Nos. 100, 51 or 52 would be required. See Permaflector Pages 9 and 10.)

To combat daylight reflections effectively, use Flexible Lighting. (See Permaflector Page 6.)

Diagrams show Adapter No. 1256, extended 150-watt position.

Illustrations show Adapter No. 1256, compressed 100-watt position. For installing these Permaflectors in a trough, see Permaflector Page 16; for flush mounting, see Permaflector Page 17.





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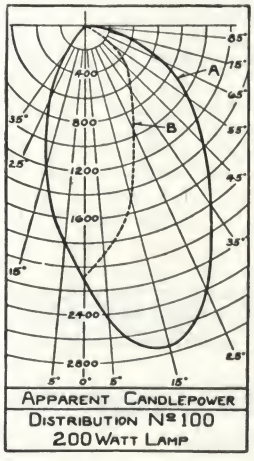
Permaflector No. 100

Designed particularly for windows 7 to 10 ft. high, having a depth (plate glass to background) ranging from one-half to three-fourths the distance from floor to reflector. Light flux 0° to 90°. Strong concentration of light between 5° and 25° gives high floor illumination near the plate glass, the area most distant from the reflector. Ideal for windows in which the trim is carried high. Also works well in deeper windows.

Other Uses—Also useful for lighting of rug racks, sales booths of garment manufacturers, interior bulletin boards, interior sales displays, paintings, indirect lighting from coves, for theater border and proscenium lights.

Spacing—For uniform distribution of light over the trim, should be spaced 12 in. on center; may be spaced as closely as 10½ in. When so spaced good light distribution may still be had when every other unit only is on. Windows should be wired with alternate outlets on separate circuits.



Size of Lamp—150-200-watt clear. Change from one size lamp to another requires merely adjustment of holder adapter. (See Permaflector Page 20.)

Flexible Lighting—(See Permaflector Page 6.)

Color Lighting—(See Permaflector Page 21.)

Flush Mounting Ring—(See Permaflector Page 19.)

Holder—2¼ in. Form "O" (See Permaflector Page 20.)

Dimensions—

Height with Adapter No. 1234, 150-watt position	8 7/16 in.
Width	9 1/8 in.
Front to back	8½ in.
Center to back	3 5/8 in.

Receptacles should be 5½ in. to center from glass; minimum 3¾ in.

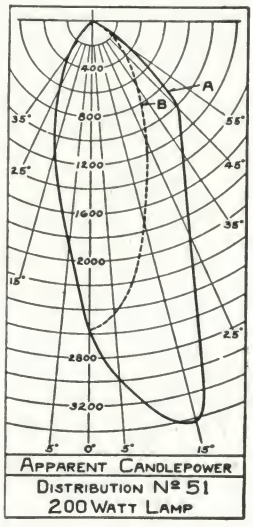
Permaflector No. 51

Designed especially for high shallow windows 7 to 10 ft. high; medium high trim; island windows or windows with upper part of glass. Concentrating; light cuts off sharply on 55° line.

Exceptional concentration of light in the 5° to 25° angle, insures effective illumination on the floor of the high and shallow windows for which this reflector is intended.

Other Uses—Also useful for borders and strips on theater stages, indirect side wall urns and coves, side walls of art galleries when placed over skylights.

Spacing—For uniform distribution of light over the trim, should usually be spaced 12 in. on center; may be spaced as closely as 10½ in. When so spaced good light distribution may still be had when every other unit only is on. Windows should be wired with alternate outlets on separate circuits.



Size of Lamp—150-200-watt clear. Change from one size lamp to another requires merely adjustment of holder adapter. (See Permaflector Page 20.)

Flexible Lighting—(See Peramflector Page 6.)

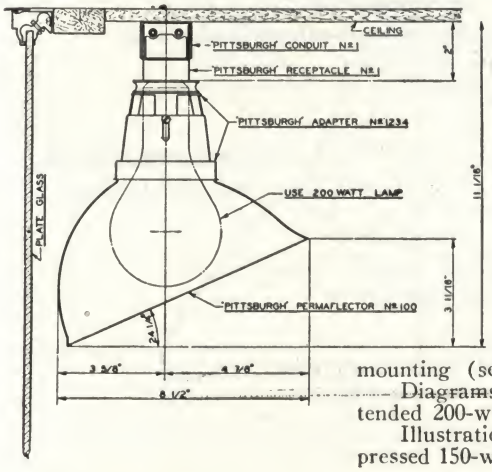
Color Lighting—(See Permaflector Page 21.)

Holder—2¼ in. Form "O." (See Permaflector Page 19.)

Dimensions—

Height with Adapter No. 1234, 150-watt position	8⅛ in.
Width	9⅜ in.
Front to back	9⅝ in.
Center to back	3⅞ in.

Receptacles should be 5½ in. to center from glass—minimum 4 in.



Lamps Recommended

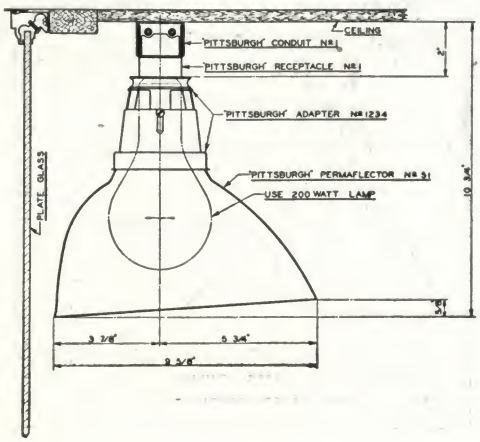
For side streets of small cities, 100-watt lamps on above spacings are recommended; for main streets of small cities, 150-watt; for side streets of large cities, 150-watt; for main streets of large cities, 200-watt.

To combat daylight reflections effectively, use Flexible Lighting (see Permaflector Page 6) or Permaflector No. 500, 551 or 555 with 300-500 watt lamps.

For installing these Permaflectors in a trough (see Permaflector Page 16); for flush mounting (see Permaflector Page 17).

Diagrams show Adapter No. 1234, extended 200-watt position.

Illustrations show Adapter No. 1234, compressed 150-watt position.



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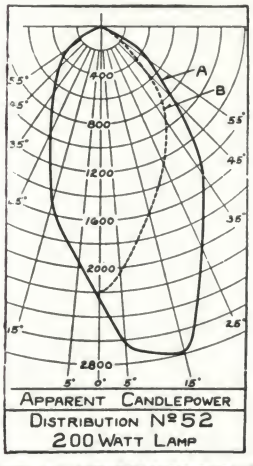
Permaflector No. 52

For same general class of windows as No. 51, but designed especially for inserting in ceiling; bottom of reflector is level and can be installed flush with ceiling.

Other Uses—Also useful for lighting automobile show rooms, show windows having open backs as in grocery stores, and for small store windows of other types. The illumination will carry to a line on the floor of the window a distance of 1.6 times the height of the reflector above the floor. For example, if the reflectors are mounted 10 ft. above the floor the light will carry back 16 ft. from the plate glass on floor of window.

Spacing—For uniform distribution of light over the trim, reflectors should usually be spaced 12 in. on center; may be spaced as close as 10½ in. When so spaced good light distribution may still be had when every other unit only is on. Should be wired with alternate outlets on separate circuits.

Size of Lamps—150-200-watt clear. Change from one size of lamp to another requires merely adjustment of holder adapter. (See Permaflector Page 36.) For side streets of small cities, 100-watt lamps on above spacings are recommended; for main streets of small cities, 150-watt; for side streets of large cities, 150-watt; for main streets of large cities, 200-watt.



Flush Mounting Ring—(See Permaflector Page 19.)

Flexible Lighting—To effectively combat daylight reflections, use Flexible Lighting (see Permaflector Page 6) or Permaflectors Nos. 500, 551 or 555 with 300-500 watt lamps.

Color Lighting—(See Permaflector Page 21.)

Holder—2¼ in. Form "O." (See Permaflector Page 21.)

Dimensions—

Height with Adapter No. 1234, 150-watt position	7 17/32 in.
Width	9 in.
Front to back	9½ in.
Center to back	3½ in.

Receptacles should be 5½ in. to center from glass; minimum 4 in.

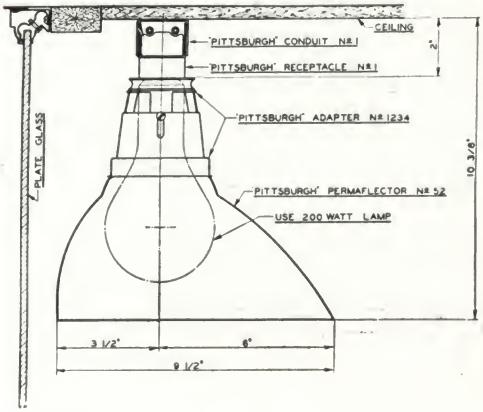


Diagram to left shows Adapter No. 1234, 200-watt position. For 150-watt lamp same adapter in compressed position should be used.

For installing in a trough (see Permaflector Page 16); for flush mounting (see Permaflector Page 17).

Permaflector No. 555

Similarly to Permaflector No. 551, it is designed for high shallow windows; medium high trim; island windows with upper part of background of glass. Not recommended for windows less than 8 ft. high.

Intended primarily for flush mounting service; bottom of reflector is level and, although having asymmetric distribution, the mouth of the reflector is circular.

From the distribution curve, it will be noted that there is an exceptional concentration of light in the five-degree to twenty-five-degree angles, which insures effective illumination on the floor of the high and shallow windows for which the reflector is intended.

Spacing—Should be installed 15 in. on centers, which will permit burning each alternate unit without making the distribution of light uneven when it is desirable to cut light in half. In small cities 300 lamps may be used; in large cities, 500-watt.

Special Comments—One large reflector should not be used where several small ones are required. To do so results in lack of uniform illumination on the trim with undesirable shadows; and where every other reflector is lighted this condition is aggravated.

When in doubt whether to use a single row of large reflectors or the Pittsburgh flexible lighting, the Permaflector Engineering Department should be consulted.

Flush Mounting Rings—See Permaflector Page 19.

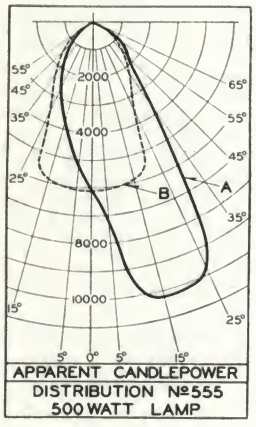
Lamps—For use with 300-500-watt lamps.

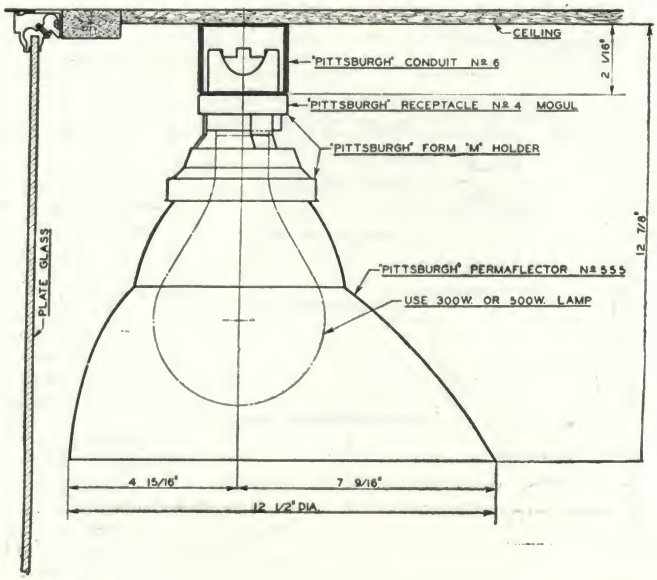
Dimensions—

Height, 10¾ in. Diameter, 12½ in.

Receptacles—6 in. on center from glass line.

When used on Conduit No. 6, discard box cover and attach receptacle and holder to conduit. (See Permaflector Page 14.)





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Permaflector No. 500

Distribution wide spreading. Designed for large deep windows in which the trim is carried up high. Since it is designed for use with the 300 and 500-watt lamp, it will find its principal use in exceptionally large windows where high intensity lighting is necessary as combating daylight reflections. Not recommended for windows less than 8 ft. high.

Spacing—Should be installed 15 in. on center which will permit burning each alternate unit without making the distribution of light uneven when it is desirable to cut the light in half. In small cities, 300-watt lamps may be used; in large cities, 500-watt lamps.

Special Comment—There is a tendency toward use of one large reflector where several small ones should be used, resulting in lack of uniform illumination on the trim and undesirable shadows. There also seems to be an idea that large lamps and reflectors are necessary to get high intensity in window lighting. This is not correct—see Permaflector Page 6, "Flexible Lighting."

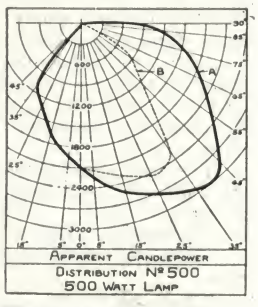
Flush Mounting Ring—(See Permaflector Page 19.)

Lamps—For use with 300-500-watt lamps.

Dimensions—

Height	12⅛ in.
Width	12 in.
Front to back	12⅜ in.
Center to back	5 1/16 in.

Receptacles 6 in. to center from glass. (When used on conduit, discard box cover and attach receptacle and holder to conduit which is shipped punched ready to receive them). (Permaflector Page 14.)



Permaflector No. 551

Distribution similar to No. 51. In general designed for exceptionally high windows where high intensity lighting is necessary as for combating daylight reflections. Not recommended for windows less than 8 ft. high.

Spacing—Should be installed 15 in. on center, which will permit burning each alternate unit without making distribution of light uneven when it is desirable to cut light in half. In small cities 300-watt lamps may be used; in large cities, 500-watt.

Special Comment—One large reflector should not be used where several small ones are required. To do so results in lack of uniform illumination on the trim with undesirable shadows; and where every other reflector is lighted this condition is aggravated.

When in doubt whether to use a single row of large reflectors or the "Pittsburgh" Flexible Lighting the "Pittsburgh" Engineering Department should be consulted. (Page 4.)

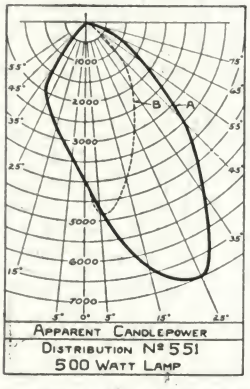
Flush Mounting Ring—(See Permaflector Page 19.)

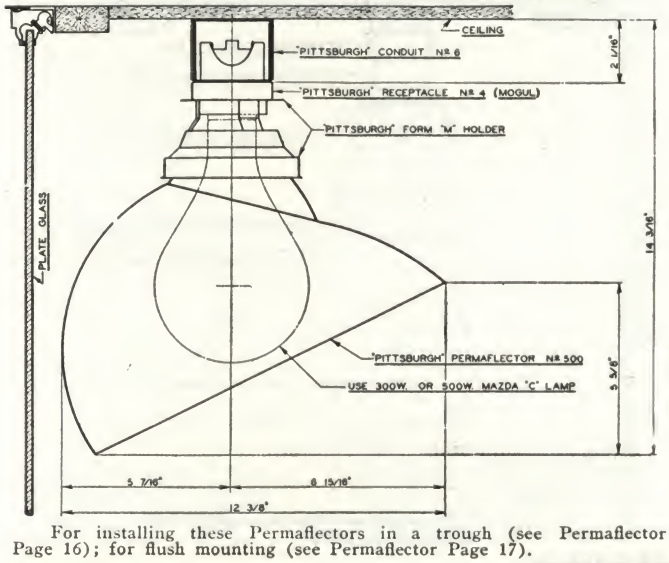
Lamps—For use with 300-500-watt lamps.

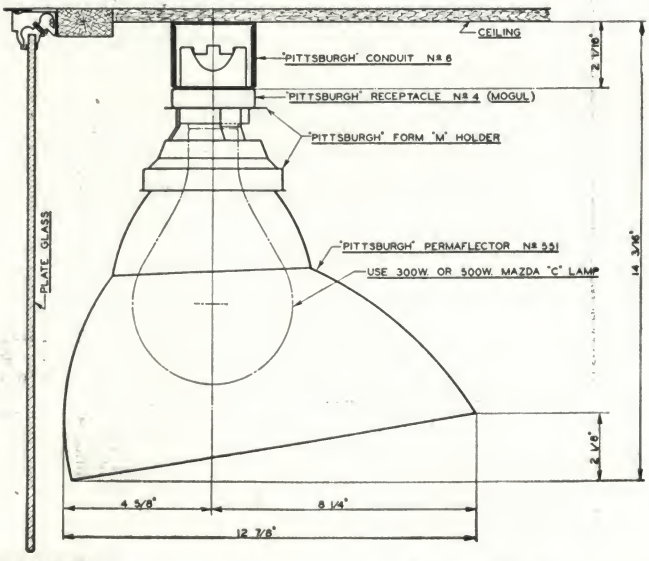
Dimensions—

Height	12⅛ in.
Width	12 in.
Front to back	12⅞ in.
Center to back	4⅝ in.

Receptacles, 6 in. to center from glass. (When used on conduit No. 6, discard box cover and attach holder to conduit which is shipped punched ready to receive them.) (See Permaflector Page 14.)







For installing these Permaflectors in a trough (see Permaflector Page 16); for flush mounting (see Permaflector Page 17).

Continued on next page

Permaflector No. 102

Designed specifically for dual service—lighting of both transparent sign and the window display. Certain stores, particularly drug and cigar stores, use signs painted along the top edge of the plate glass. Where it is possible to install with bottom of reflectors above top of sign, regular "Pittsburgh" window reflectors will effectively light both sign and display. But where top of sign is at level where reflectors must be mounted, it has not been possible heretofore to effectively light both.

Spacing of Reflectors—For even lighting of transparent sign or valance, with receptacles on which reflectors are mounted approximately level with top of sign, use following:

SPACING FOR DUAL SERVICE

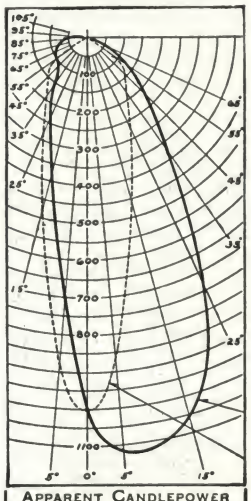
With maximum depth of sign, in.	Receptacles should be distant from the glass, in.	Maximum spacing between reflectors, in.
12	6	12
13	7	14
14	8	16
15	9	18
16	10	20
17	11	22
18	12	24

Ordinarily spacing between reflectors should not exceed 12 in., excepting where general standard of window lighting is very low or in the case of very small show windows.

Lamp—100-watt A-23; 150-200-watt clear. Unless otherwise ordered, furnished with Adapter No. 1256 (for A-23 100-watt and 150-watt clear). (See Adapters, Permaflector Page 20.)

Holder—2¼ in. Form "O."

Dimensions—
Height with Adapter No. 1256, 150-watt position 8⅛ in.
Width ..... 9⅞ in.
Front to back..... 9½ in.
Center to back..... 4 in.



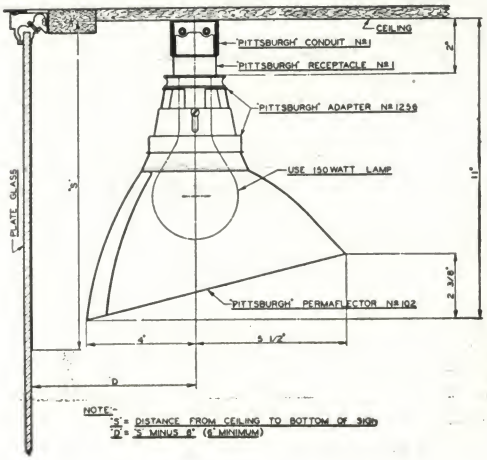
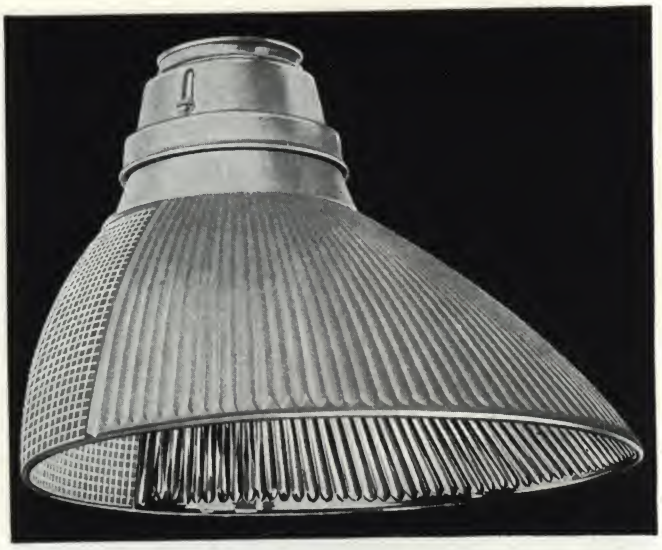


Diagram to left shows Adapter No. 1256, 150-watt position.

For 100-watt A-23 lamp same adapter in compressed position should be used.

For 200-watt lamp use Adapter No. 1234 extended as in diagram to right.



Permaflector No. 112

No. 112 is a companion to Permaflector No. 102, brought out especially for windows in which this dual lighting service is required and which have no background, or have transparent glass in the upper part of the background.

For such windows, No. 112 will be better suited, because it completely conceals the lamp from view from within the store when installed in such open back or transparent back windows.

Obviously it does not light up as high on the background as No. 102; hence 102 will be the preferred one for use in totally enclosed windows where it is necessary to light up from floor to ceiling on the background.

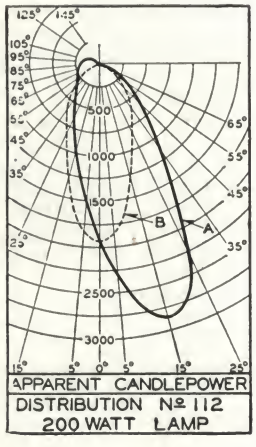
Ordinary transparent or translucent glass reflectors installed in a show window will waste light in the entire upper hemisphere in order to illuminate a small patch of sign. Permaflectors No. 102 and 112, through the medium of a transparent glass panel on the rear section of the reflector, efficiently illuminate the sign but do not waste light in the upper directions other than the sign.

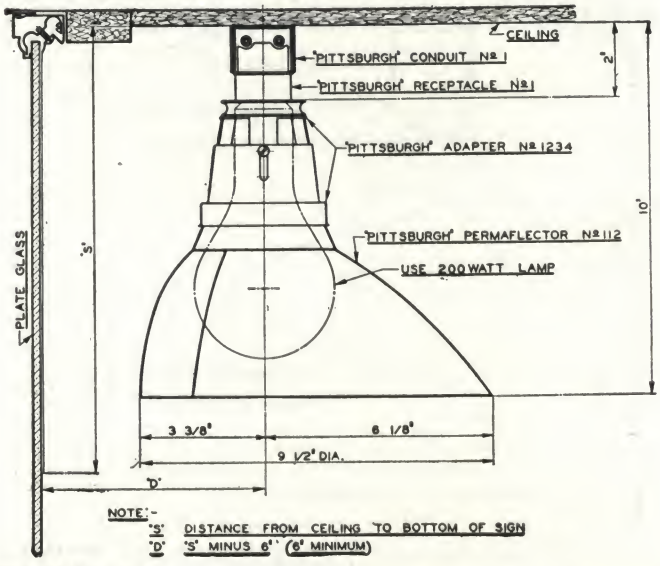
Note the distribution curves, herewith, showing how the sign lighting is accomplished without appreciable loss of "punch" in the main beam.

The spacing of Permaflector No. 112, lamp sizes and holders, are same as for No. 102.

Dimension—Height 5¼ in.

Diameter—9½ in. (circular).





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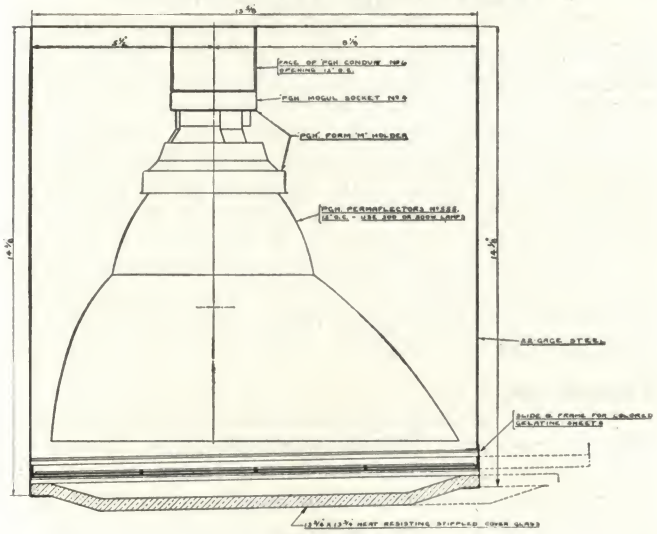
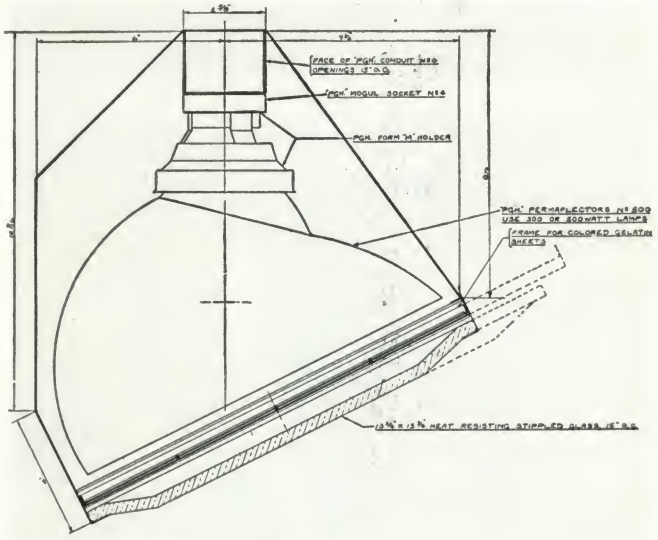


WL-555



WL-500

ENCLOSED WINDOW PERMAFLECTORS

There is a limited demand for window lighting equipment of the enclosed type. Such equipment is sometimes desired for large department store windows, particularly corner windows and arcade windows.

Pittsburgh enclosed Permaflectors have been developed to satisfy this want. Nos. WL-500 and WL-555 illustrated herewith consists of a continuous metallic troughing in which are installed 500-watt Permaflectors spaced 15 in. on centers. Beneath each Permaflector is installed a square convex heat resisting stippled glass plate, the purpose of which is to completely conceal the lamp filament from view. It accomplishes this purpose effectively without materially affecting the light distribution from the Permaflectors. In other words, Pittsburgh Enclosed Permaflectors provide efficient window illumination of correct distribution from enclosed equipment, as will be noted from an examination of the light distribution curves of each of these units, shown below.

To make easy access to the Permaflectors and lamps, the heat resisting stippled glass plate is suspended below each Permaflector in a guide which enables one to slide the glass plate forward as shown by the dotted lines. The guides hold the plates in place by gravity.

Another set of guides for supporting frames to contain colored gelatine sheets, to provide colored illumination when same is desired, are also incorporated in the unit. The color frame slides forward in the same manner as the glass plate.

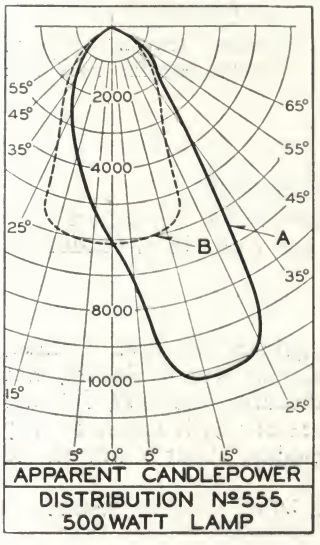
Enclosed window Permaflectors No. WL-500 and No. WL-555 are custom built for show windows. In order that they may be effectively used, provision for their installation should be made by the architect when working up the detailed designs of the show windows.

From the architect's plans our engineering department will prepare the detailed design of the required type of enclosed window Permaflectors for the particular windows.

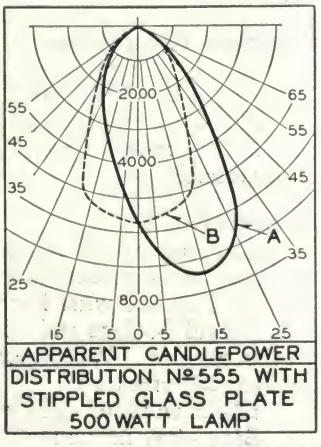
While enclosed lighting equipment of this kind has been specified primarily for large windows requiring high intensity of illumination, smaller windows requiring the use of 100, 150, and 200-watt lamps, may be similarly equipped. Space does not permit illustration of this smaller equipment, but our engineering department may be consulted at any time by the architect interested therein.

Herewith is a list of the square convex heat resisting glass plates available:

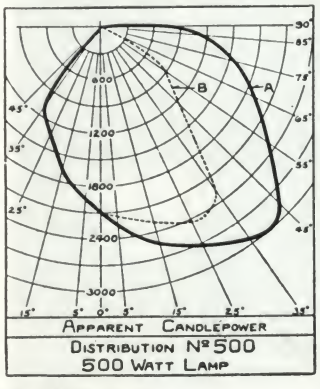
Plate No.	Size in inches	Description	For use with	
			Permaflector No.	Size of lamp, watts
1	13⅝ square	Stippled inside	500, 551, 555	300–500
2	13⅝ square	60° spread ribbed inside	C-500	300–500
3	17⅞ square	Stippled inside	I-1000, I-505	300, 500, 750, 1000
5	10½ square	Stippled inside	51, 52, 100, C-201	150–200
6	8½ square	Stippled inside	C-100, 55, 110	100–150
7	7 square	Stippled inside	I-60, P-75, P-101, P-151	100–150



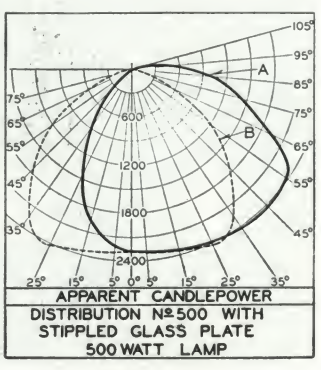
APPARENT CANDLEPOWER
DISTRIBUTION Nº555
500 WATT LAMP



APPARENT CANDLEPOWER
DISTRIBUTION Nº555 WITH
STIPPLED GLASS PLATE
500 WATT LAMP



APPARENT CANDLEPOWER
DISTRIBUTION Nº500
500 WATT LAMP



APPARENT CANDLEPOWER
DISTRIBUTION Nº500 WITH
STIPPLED GLASS PLATE
500 WATT LAMP

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"EASY-TO-INSTALL" CONDUIT

"Easy-to-Install" Conduit in combination with Permaflectors constitutes "a window lighting system." Conduit, receptacles, holders and Permaflectors, all finished in silver colored satin finish, harmonize.

This conduit provides a time and money-saving method of installing lamps in show windows, especially when close centering of the lamps is needed. Quickly installed, being fastened to ceiling by screws going through conduit or supported on brackets.

"Easy-to-Install" Conduit avoids necessity of cutting through ceiling or wall for each receptacle and makes it possible to space lamps properly to get even light distribution. Made to order to fit each job.

Conduit No. 1

Consists of 20 gauge galvanized steel channel fitted with the necessary porcelain receptacles *not wired* and with or without holders for Permaflectors.

Wiring is very simple; the back member being lifted off, the binding screws in the receptacles are exposed; can then be quickly wired.

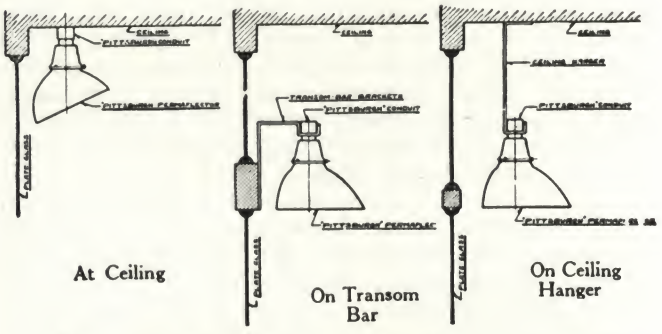
When Show Window Permaflectors Nos. 100, 51, 52, 55 and 110 are furnished with conduit, holders are not required, the adapters furnished on these reflectors being attached directly to the conduit.

Conduit No. 1 is also used in cove lighting with Reflectors Nos. 100, 51, 52, 71, 55, 110, 25, 26, 27 and 28.

Size—1⅜ in. high, 1¾ in. wide. Blank ends or ends with ½-in. hole, furnished as desired, no charge for splicings. Accommodates six No. 12 wires.

Brackets

When ordering transom bar brackets or ceiling hangers, length must be given.



Transom bar bracket standard size has vertical members 10 in. long and holds conduit 5½ in. from face of transom bar to center line of conduit.

Ceiling hangers made in standard lengths of 6, 8, 10, 12, 14, 16, 18 and 20 in. Special lengths available made to order.

Porcelain Receptacles

No. 1, medium base (as shown).
No. 2, medium base (as shown).
No. 3, medium base, angle socket (as shown).
No. 4, mogul base, for use with No. 6 conduit or B-3 assembly.

Conduit No. 6

Consists of 20 gauge galvanized steel channel, punched to accommodate Mogul No. 4 Socket, not wired. For use with Permaflectors Nos. 500, 551 and 555, Mogul Sockets and holders of which attach directly to the conduit. Will accommodate about 6 circuits, or 12 No. 12 wires.

Blank ends, or ends with ½-in. hole, as desired.

Size—2¾ in. wide, $2\frac{1}{16}$ in. high.

Continued on next page

Conduit No. 2

Similar to Conduit No. 1. Size, however, is but $\frac{13}{16}$ by $1\frac{13}{16}$ in., for use only with "Pittsburgh" Angle Sockets, with "Pittsburgh" Reflectors No. P-40, No. P-75, No. P-76 and No. P-151.

The "Pittsburgh" angle sockets make it possible to rotate the reflectors on their axes after the installation is completed and burning, thus assuring best light distribution.

½-in. knock-out furnished at top or bottom as required.

Furnished with Pittsburgh Angle Receptacle and Form "S" or "L" (see Permaflector Page 20) as required.

Unless the small size of No. 2 conduit is a real advantage in any particular cove, it is preferable to use Conduit No. 2-A, described below.

Conduit No. 2A

Same as No. 2, excepting size is $1\frac{3}{8}$ in. high by $1\frac{1}{4}$ in. wide. Has the advantage of accommodating more wires and can be furnished with flexible joints.

OUTLET BOX ASSEMBLIES

Series B-1

For ordinary conduit wiring in coves, with such reflectors as Nos. 25, 26, 27, 28, 71, 75, 51, 52 and 100. Consists of a 3½ in. or 4 in. outlet box cover, equipped with special "Pittsburgh" Porcelain Socket No. 1 arranged to accommodate the "Pittsburgh" Adapters (see Permaflector Page 20).

OUTLET BOX ASSEMBLIES, SERIES B-1

Cat. No.	Consists of
B-1-3¼	Socket and 3¼ in. outlet box cover
B-1-3¼-S	As above, plus 2¼ in. "S" holder. (See Permaflector Page 20.)
B-1-3¼-L	As above, plus 2¼ in. "L" holder. (See Permaflector Page 20.)
B-1-¾-LC	As above, plus 2¼ in. "LC" holder. (See Permaflector Page 20.)
B-1-4	Socket and 4 in. outlet box cover
B-1-4-S	As above, plus 2¼ in. "S" holder. (See Permaflector Page 20.)
B-1-4-L	As above, plus 2¼ in. "L" holder. (See Permaflector Page 20.)
B-1-4-LC	As above, plus 2¼ in. "LC" holder. (See Permaflector Page 20.)

Note: Adapters Nos. 1234 and 1256 attach to B-1-3¼ or B-1-4.

Series B-2

For jobs where the cove is a circle or ellipse with short radius; in such coves it is not practicable to use "Pittsburgh" Conduit because of the curvature.

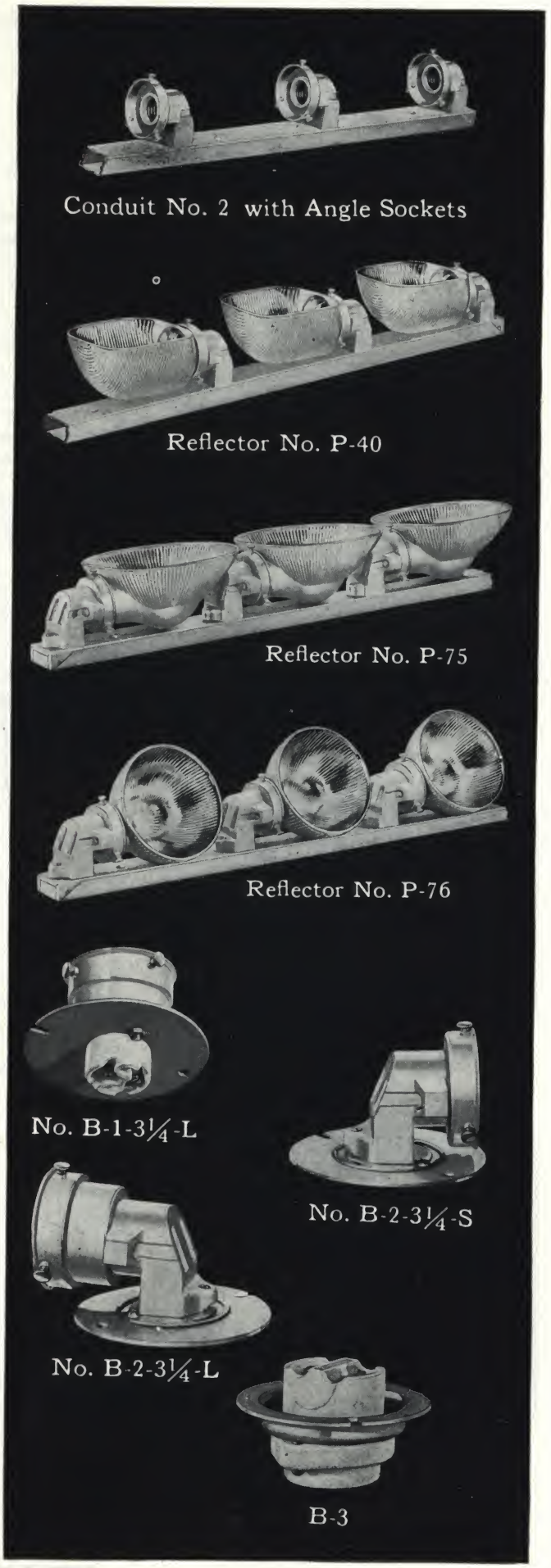
The assembly No. B-2-3¼-S and B-2-3¼-L of outlet box cover, angle socket and shade holder illustrated herewith makes it convenient to use the reflectors No. P-40, No. P-75, No. P-76, No. P-101, No. P-151 and No. P-200 in cove lighting work. It does not matter in what position the outlet box is installed, since by means of the slotted center piece the socket may be rotated into alignment with the cove.

OUTLET BOX ASSEMBLIES, SERIES B-2

Cat. No.	Consists of
B-2-3¼	Angle socket and 3¼ in. outlet box cover
B-2-3¼-S	As above, plus 2¼ in. "S" holder. (See Permaflector Page 20.)
B-2-3¼-L	As above, plus 2¼ in. "L" holder. (See Permaflector Page 20.)
B-2-3¼-LC	As above, plus 2¼ in. "LC" holder. (See Permaflector Page 20.)
B-2-4	Angle socket and 4 in. outlet box cover
B-2-4-S	As above, plus 2¼ in. "S" holder. (See Permaflector Page 20.)
B-2-4-L	As above, plus 2¼ in. "L" holder. (See Permaflector Page 20.)
B-2-4-LC	As above, plus 2¼ in. "LC" holder. (See Permaflector Page 20.)

Series B-3

No. B-3 consists of Pittsburgh Mogul Socket No. 4, with 4 in. outlet box cover, raised cover.



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TYPICAL TROUGH AND FLUSH MOUNTING INSTALLATIONS

When designing the better class of show windows, architects more and more make special provision for the installation of the window lighting equipment. Two general forms are employed.

In the first, a properly dimensioned trough is set parallel with and above the plate glass; the other method provides for setting the reflectors flush in the ceiling of the show window.

Trough Mounting

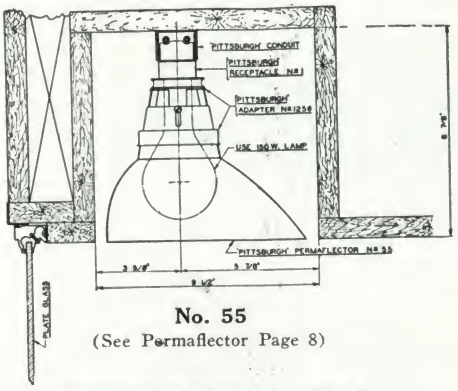
On this page are illustrated the cross sections of various troughs for accommodating the several different types of Permaflectors employed in show window lighting and as listed previously on Permaflector pages 16 to 19, inclusive. The usual method of installing reflectors suspended from the ceiling of the window, exposed, is shown on the same page with the illustration and lighting data pertaining to each reflector.

Local building codes may require troughs of this type to be lined with metal although ordinarily there is no real need for this precaution. Where unusually heavy wattage is required in a small confined space, to combat daylight reflections, it is advisable to line the trough and perhaps even ventilate same.

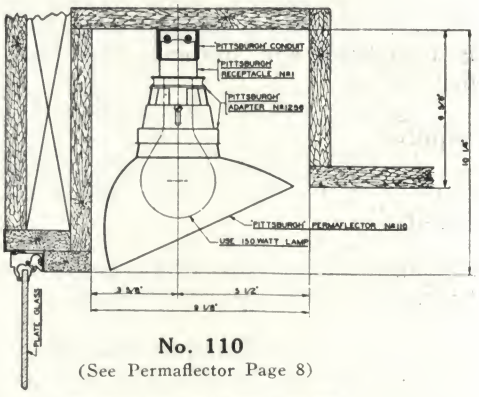
Scale: 1½" = 12"

Note: Permaflectors C-100 and C-201 are used only in windows of extreme height, shallow depth and low trim. (See Permaflector Page 22.)

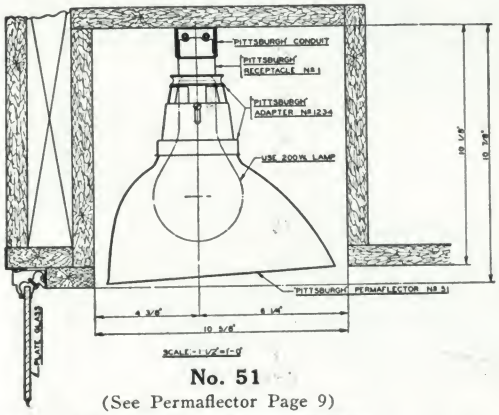
For trough mounting Permaflector C-201. (See Permaflector Page 22.)



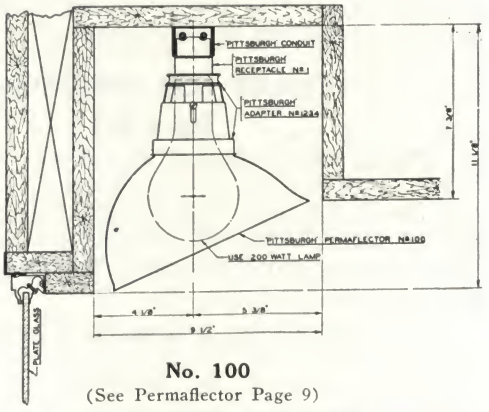
No. 55
(See Permaflector Page 8)



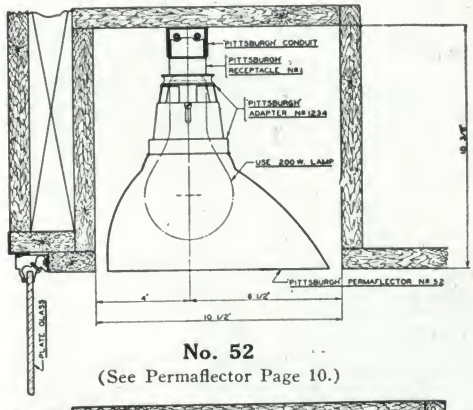
No. 110
(See Permaflector Page 8)



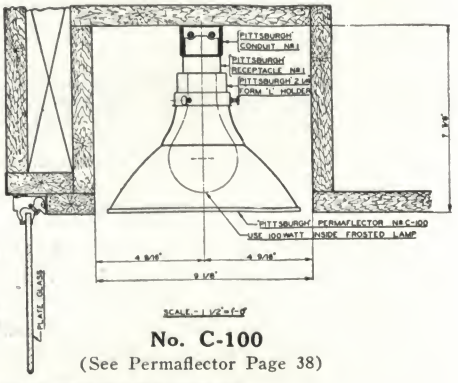
No. 51
(See Permaflector Page 9)



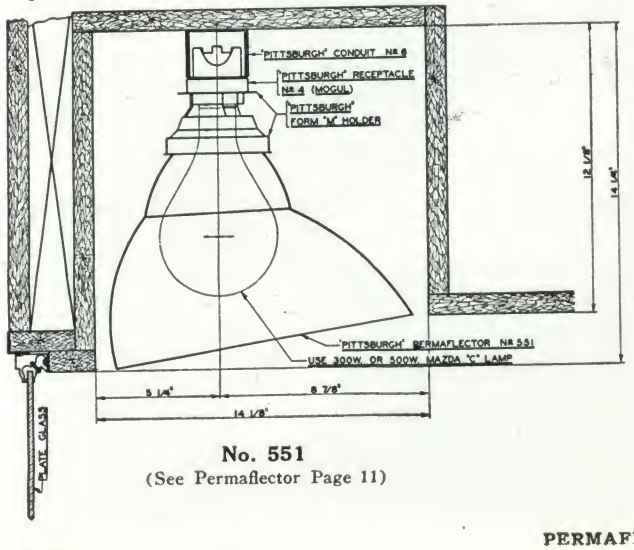
No. 100
(See Permaflector Page 9)



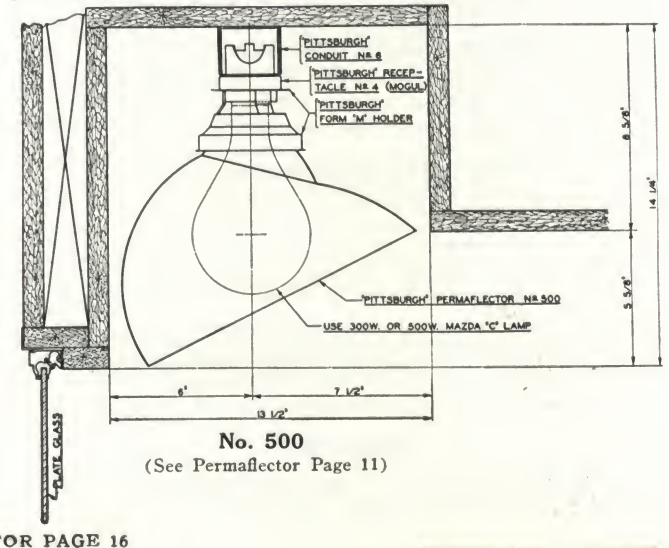
No. 52
(See Permaflector Page 10.)



No. C-100
(See Permaflector Page 38)



No. 551
(See Permaflector Page 11)



No. 500
(See Permaflector Page 11)

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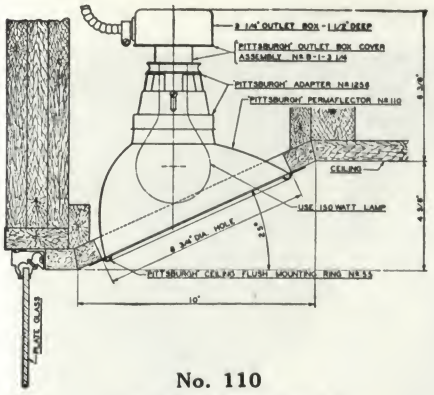
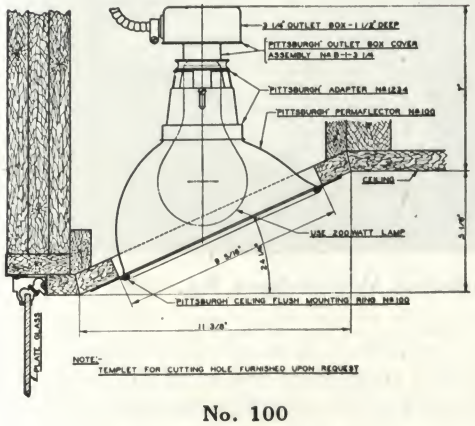
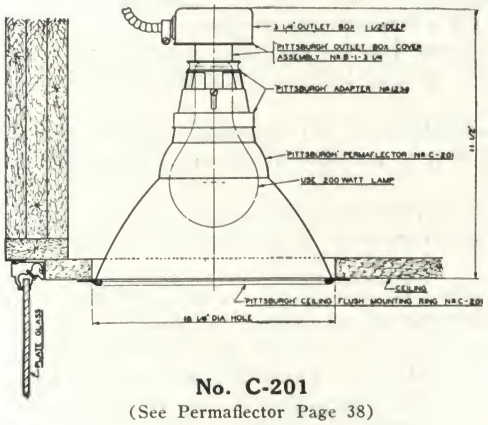


No. 110
(See Permaflector Page 8)



No. 100
(See Permaflector Page 9)



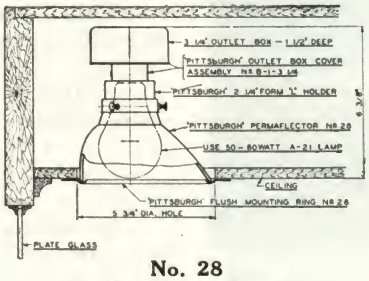
No. C-201
(See Permaflector Page 38)

Flush Mounting

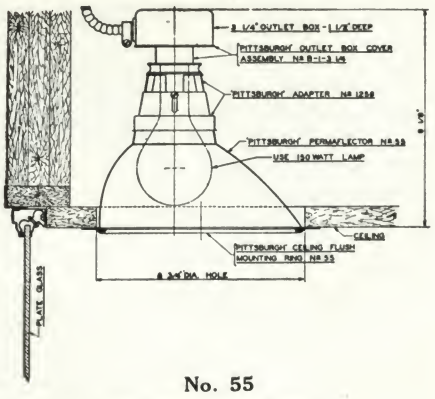
The illustrations on this page give design data for flush mounting the various show window lighting Permaflectors. For flush mounting service, "Easy-to-Install" Conduit does not provide as convenient a method of wiring as the use of ordinary wiring material. For convenience in making the installation, Pittsburgh Outlet Box Cover Assemblies to which the Adapters of the reflectors are directly attached, were brought out. It will be noted that Permaflectors No. 100, No. 110 and No. 500 are cut off at an oblique angle. To successfully set these Permaflectors flush, it is necessary to construct the ceiling with a dip towards the plate glass at the same angle. Illustrations on this page clearly indicate the method to be employed.

When flush mounting Permaflectors it is necessary that the opening in the ceiling be cut to the proper contour. Upon request a templet drawing for cutting the opening will be supplied.

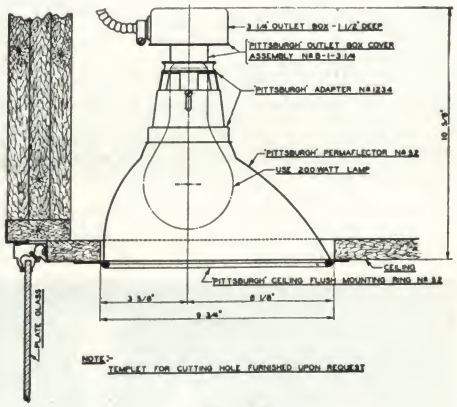
For high wattages in confined spaces it may be desirable to provide ventilation to prevent abnormal temperatures.



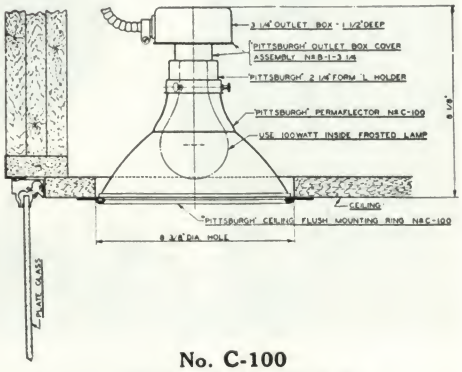
No. 28
(See Permaflector Page 25)



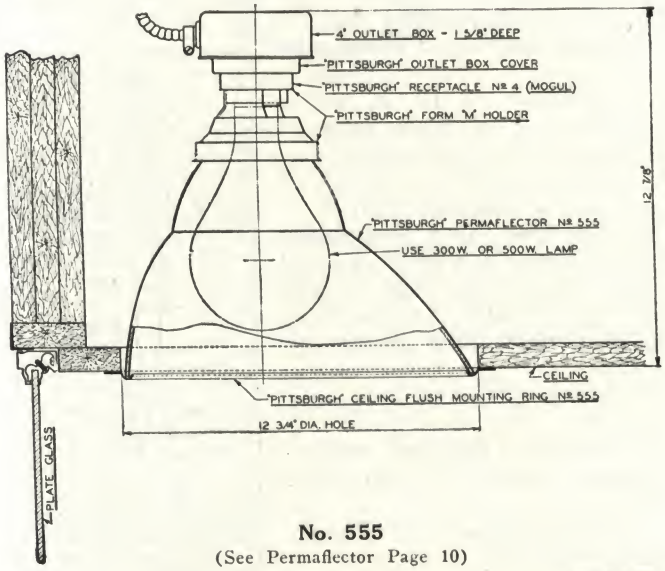
No. 55
(See Permaflector Page 8)



No. 52
(See Permaflector Page 10)

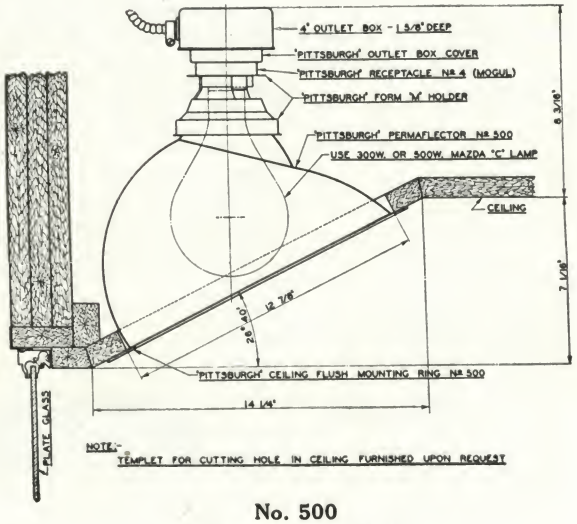


No. C-100
(See Permaflector Page 38)



No. 555
(See Permaflector Page 10)

Note: Permaflectors C-100 and C-201 are used only in windows of extreme height, shallow depth and low trim. (See Permaflector Page 38.)



No. 500
(See Permaflector Page 11)

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PERMAFLECTOR WINDO-SPOTS AND WINDO-FLOOD

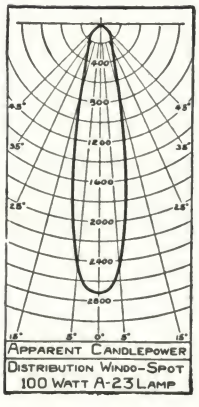
These provide an effective method of high lighting with clear or colored light portions of the window display to which particular attention should be drawn.

The Windo-Spots and Windo-Flood are auxiliary equipment and are not intended as the sole sources of illumination in a show window. They perform a very definite and necessary service, however, where a very narrow beam of high apparent candlepower is required.

Other Uses—Useful for reducing daylight reflections and for special applications, such as theater stages, automobile show rooms where it is desired to silhouette a car against a light background, dance halls for so-called "moonlight" dances, for the lighting of walls of art galleries, skylights and any other purpose where intense illumination is desired over a limited area.

Spacing—The number installed in a show window depends largely upon the psychological effect at which the display man is aiming. In general, it is well to provide two in each show window as an auxiliary to the regular show window lighting. When wiring the window several conveniently placed extra receptacles should be provided in order to properly place these units.

Permaflector Windo-Spot No. 100



Similar in construction to Windo-Spot No. 200 excepting smaller and equipped with a different reflector.

Reflector is 8¼ in. in diameter.

Overall height, inclusive of socket and holder, 9 in.

Lamp—100-watt A-23 (inside frosted) must be used.

Furnished complete, excepting lamp, including three feet of cord and plug.

Color-Lites — (See Permaflector Page 21.)

Portable Base

For use with Windo-Spots No. 200 and No. 100 or Windo-Flood. Cast iron 8 in. in diameter.

Wall plate to be screwed to Portable Base.

Permaflector Windo-Spot No. 200

The "Pittsburgh" Windo-Spot No. 200 does not take the place of standard show window lighting but supplements it with a convenient means of high lighting those parts of displays which should be brought out most strongly.

Throws a flood of white light (or colored if Color-Lite is used) with a strong central spot.

The center beam has a maximum candle power of 18,000, as shown by the laboratory distribution curve herewith.

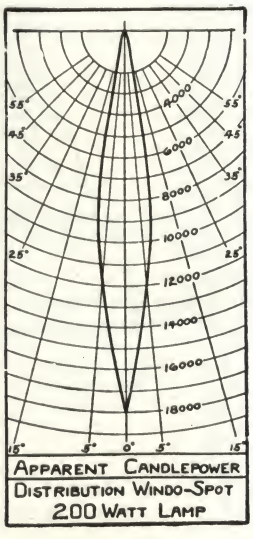
This is equivalent to 90 apparent candle power per watt, and is a very unusual achievement in reflector design.

Simple in construction, light weight and portable; easily attached and removed; handy to operate and low in price.

Can be attached by screws or bolts to ceiling, wall or floor or any horizontal or vertical surface.

By loosening large wing nut at the top, the supporting stem may be rotated; by loosening the smaller wing nut at the bracket joint, the reflector may be tilted.

This makes it possible to get any position necessary to direct the beam of light to any particular object in the window.



Reflector is 10 in. across opening; 12 in. from front of reflector to back of socket.

Either gelatin or glass Color-Lite may be used with it.

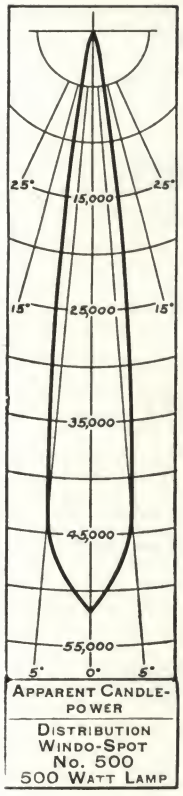
For Use As a Portable—Simply screw to a block of wood large enough so that it will not upset easily. Or use with metal portable base shown opposite.

Lamp—200-watt lamp must be used.

Furnished complete, excepting lamp, with 3 ft. of cord with plug.

Color-Lites—(See Permaflector Page 21.)

Continued on next page



Windo-Spot No. 500

Principal Use—For those conditions in show window lighting and for other uses where a more intense beam is desired than is possible to secure with the Windo-Spot No. 200. Gives a very concentrating beam of light similar to Windo-Spot No. 200, but with a candlepower maximum of 52,000, more than 100 candlepower per watt.

The Windo-Spot No. 500 is equipped with an adjustable bracket for attaching to the ceiling of the show window or other supporting surface. Universal motion of the reflector may be secured by loosening the one large thumbscrew; reflector may then be tilted to any desired position and there fixed by tightening the thumbscrew. The bracket is exceptionally sturdy in construction and very easily manipulated.

Furnished complete as shown, with 3 ft. of armored cable and attachment plug.

Lamps—300-500-watt clear.

Dimensions—

Height overall, including bracket.18 in.
Diameter of reflector.....13½ in.

(Windo-Spot No. 500 becomes a Windo-Flood if frosted lamp is used.)

No. 500-551

No. 55

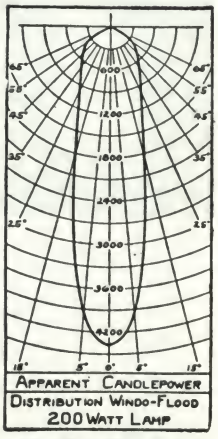
Windo-Flood

The Windo-Flood differs from the Windo-Spot only in design of the reflector, which throws a broader flood of light than the Windo-Spot, but with a central beam of less intensity.

Furnished complete excepting lamp, including 3-ft. cord with plug.

Lamp—200-watt only.

Color-Lites—(See Permaflector Page 21.)



FLUSH MOUNTING RINGS

(See also Permaflector Page 17)

For Permaflector No.	Flush Ring No.	Templet
100	100	Cardboard templet free on request
52	52	Cardboard templet free on request
551	551	Cardboard templet free on request
500	500	Blueprint free on request shows exact size to cut hole in ceiling
555	555	*Hole in ceiling to be circular, 12¾-in. diam.
28	28	*Hole in ceiling to be circular, 5¾-in. diam.
110, 55 E-100 I-75	55	*Hole in ceiling to be circular, 8¾-in. diam.
E-25	E-25	Hole in ceiling to be circular, 4⅜-in. diam.
I-60, E-75	I-60	Hole in ceiling to be circular, 7 -in. diam.
C-100 I-100	C-100	Hole in ceiling to be circular, 8⅜-in. diam.
C-201 I-201	C-201	Hole in ceiling to be circular, 10¼-in. diam.
E-200 E-225	E-200	Hole in ceiling to be circular, 10 -in. diam.

*Blueprint free on request, showing how to locate centers.

Permaflector Lighting Through Skylights

If interested ask for 8-page folder "Henry Art Gallery"

Continued on next page

ADAPTERS

The Permaflector Adapters (illustrated) are designed to be supported from 2¼-in. Form "O" Holders or attached to Permaflector "Easy-to-Install" Conduit No. 1.

(Screws for attaching adapters to conduit are furnished with the conduit.)

For 100-watt A-23 (Inside Frosted) Lamp—Permaflectors No. 55, No. 110, No. 102 and No. 112 will be furnished with Adapter No. 1256.

If Adapter No. 1234 is wanted with Permaflector No. 102, or No. 112 it must be specified.

For 150 to 200-watt No. PS-25 (Clear) Lamp—Permaflectors Nos. 100, 51 and 52 will be furnished with Adapter No. 1234.

If any of these reflectors are desired equipped with Adapter No. 1256, the order must so specify.

The use of the wrong adapter changes the position of the focal center of the lamp in its relation to the reflector, hence alters the distribution of the lighting and greatly lessens the lighting effectiveness.

HOLDERS

No. OB

No. OP

No. S

No. HB

No. HP

No. L

Form "O" and Form "H" Holders are common to the trade and may be had at any electrical store or jobber. Holders are not a part of the Pittsburgh line, but we supply them as a matter of accommodation.

For "O" (Low) Holders, 2¼ in.

The Uno Holder for brass shell, threaded sockets (No. OB).

Weatherproof, for porcelain sockets with holder grooves (No. OP).

For Sockets Nos. 1 or 3 or Assemblies Nos. B-1 or B-2 (No. S).

Form "O" (Low) Holder, 3¼ in.

Form S-3¼. Similar to Form S.

Form "H" (High) Holders, 2¼ in.

No. 10

The Uno Holder, for brass shell, threaded sockets (No. HB).

Weatherproof, for porcelain sockets with holder grooves (No. HP).

For Socket Nos. 1 or 3, Assemblies Nos. B-1 or B-2 (No. L); (or No. "LC") which is the same as (No. "L"), excepting it is longer.

Special Holder No. 10

For use with No. I-502 and B-3 Assembly or No. 6 Conduit.

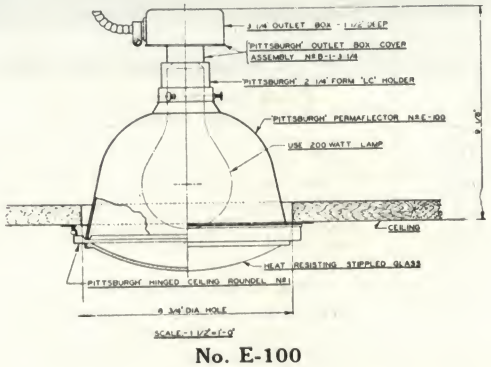
HINGED CEILING ROUNDELS

Number 1—Diameter 10 in. Includes stippled glass roundel. For use with Permaflectors Nos. 55, 110, E-100 and I-75.

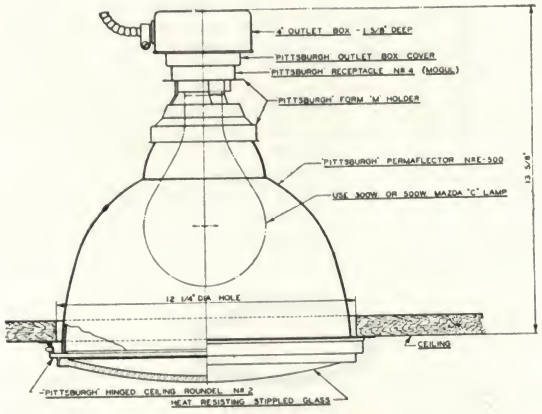
The E-100, when used with Ceiling Roundel No. 1 may be used with 200-watt lamp if attached to LC holder. (LC Holder is similar to Holder L, but slightly higher.)

Hinged Ceiling Roundel

Number 2—Diameter 15 in. Includes stippled glass roundel. For use with Permaflectors Nos. E-500, 551 and 500.



No. E-100



No. E-500

No. E-100 and No. 1 Ceiling Roundels
Under and above balcony

Continued on next page

PERMAFLECTOR COLOR-LITES

Color-Lite No. 1 (Gelatin)

Consists of retainer frame with spiral springs, inner retainer and four gelatin sheets, one each of red, blue, green and amber. The gelatin is held in place between the two steel rings, each of which have retainer wires stretched across the opening.

For Permaflectors No. 51, No. 52, No. 100, Windo-Spot No. 200 and Windo-Flood. To attach merely hook the springs in holes of the adapter; to remove, unhook. Neither lamp nor reflector need be removed.

Color-Lite No. 5 (Gelatin)

For Permaflectors Nos. 110 and 55, E-100, I-75 and Windo-Spot No. 100, similar to Color-Lite No. 1.

Color-Lite No. 2 (Glass)

Similar to No. 1

Consists of retainer frame with coiled springs, inner retainer and color glass. The color will not fade, glass is heat-resisting and will not break due to heat of lamp; does not shrink or wrinkle; not affected by moisture. Colors: Red, blue, green, amber. Specify color desired when ordering. For use with Permaflectors Nos. 51, 52, 100, Windo-Spot No. 200 and Windo-Flood.

Color-Lite No. 4 (Glass)

For use with "Pittsburgh" Reflectors Nos. P-75, P-151, P-101, E-75 and I-60. Consists of retainer frame with one color glass. Frame fits on over bead on edge of reflector. Glass rounded and its frame hinged for ready access to lamp. Colors are red, blue, green and amber. Specify color desired when ordering.

Note: When Color-Lites are wanted for use with flush-mounting rings (Permaflector Page 19) order must so state.

Color-Lite No. 6

This is a glass Color-Lite for Permaflectors Nos. 110, 55, E-100, I-75, C-100, Windo-Spot No. 100, similar to Color-Lite No. 2 but of smaller diameter.

Color-Lite No. 7

This is a gelatine Color-Lite for Permaflectors Nos. 500, 551, 555, C-500, and Windo-Spot No. 500, similar to Color-Lite No. 1 but of larger diameter.

Color-Lite No. 8

This is a glass Color-Lite for Permaflectors Nos. 500, 551, 555, C-500 and Windo-Spot No. 500, similar to Color-Lite No. 2 but of larger diameter.

Color-Lite F-1

For use with Floodlight FLC-250. Consists of pressed glass Roundel, 10⅜ in. in diameter. Snaps over mouth of Permaflector, being held in place by three spring clips. Installed inside of unit under protection of heat-resisting glass cover. Available in red, amber, green, blue.

Color-Lite F-2

8-in. pressed glass roundel, for use with Floodlight No. FLC-100. Colors: Red, amber, green, blue.

Color-Lite F-3

Consists of blown glass cap, 7⅞ in. in diameter, ventilated metal cap at top and clamping spring steel strap. Available in four colors, red, amber, green, blue.

Cap rests on offset in reflector contour as shown below. Color-Lite is clamped in place by spring steel strap, provided with notches at end which clamp under knurled head screws and with hole in center for centering over fillister head screw, binding the ventilated cap to the color cap.

The ventilated metal cap is in two parts, clamped into opening at top of glass cap. Cooling air circulates past lamp bulb and through ventilated metal cap so arranged as to permit the air to pass but allows no escape of white light.

Color-Lite F-3 places no pressure on lamp bulb, being supported entirely independent of lamp. In combination with the Permaflectors used in Floodlights FLC-501 and FLC-1001, it provides a ventilated lamp chamber and means of producing colored floodlighting heretofore not available.

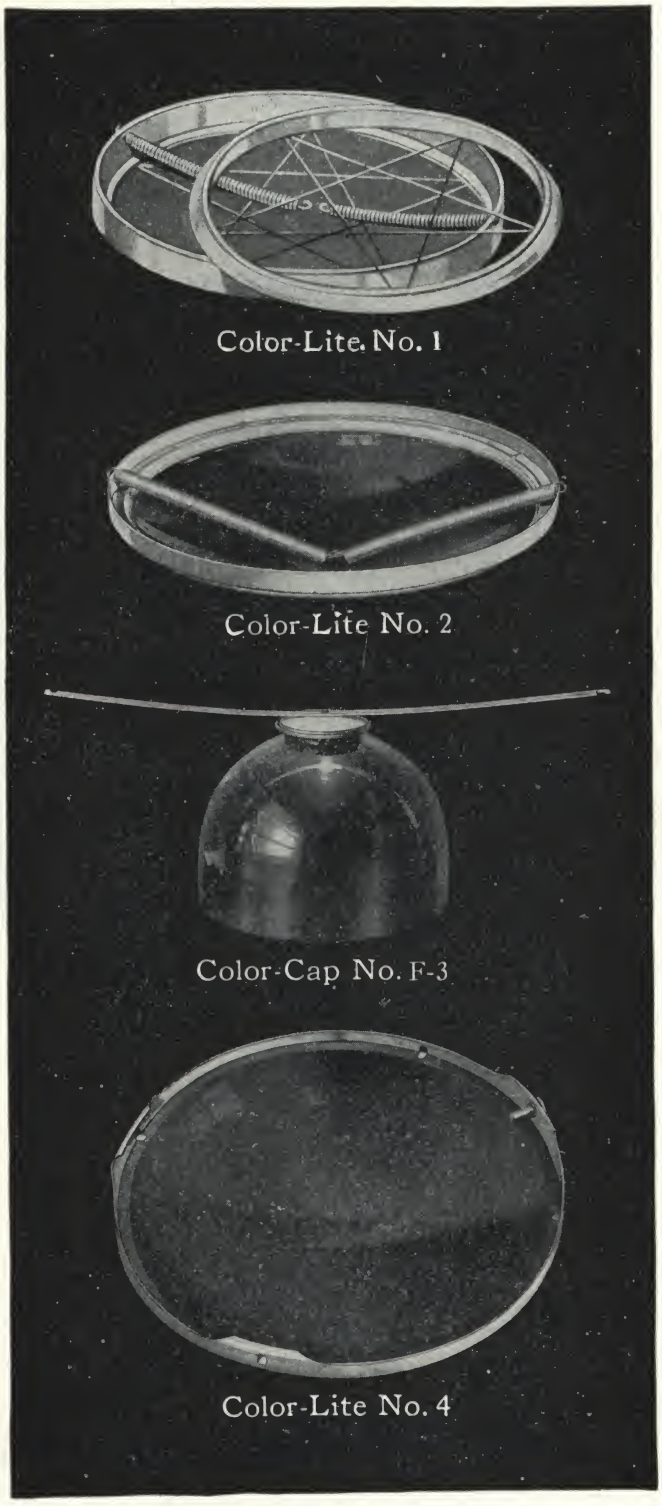
Can be used only with Nos. FLC-501 and FLC-1001.

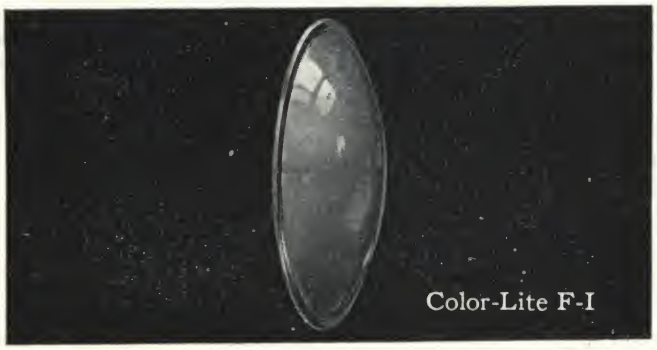
Color-Lite F-4

A 9½-in. pressed glass roundel, for use with Floodlight FLC-104. Colors: Red, amber, green, blue.

Color-Lite F-5

A 12-in. pressed glass roundel, for use with Floodlights FLC-300 and FL-301. Colors: Red, amber, green, blue.





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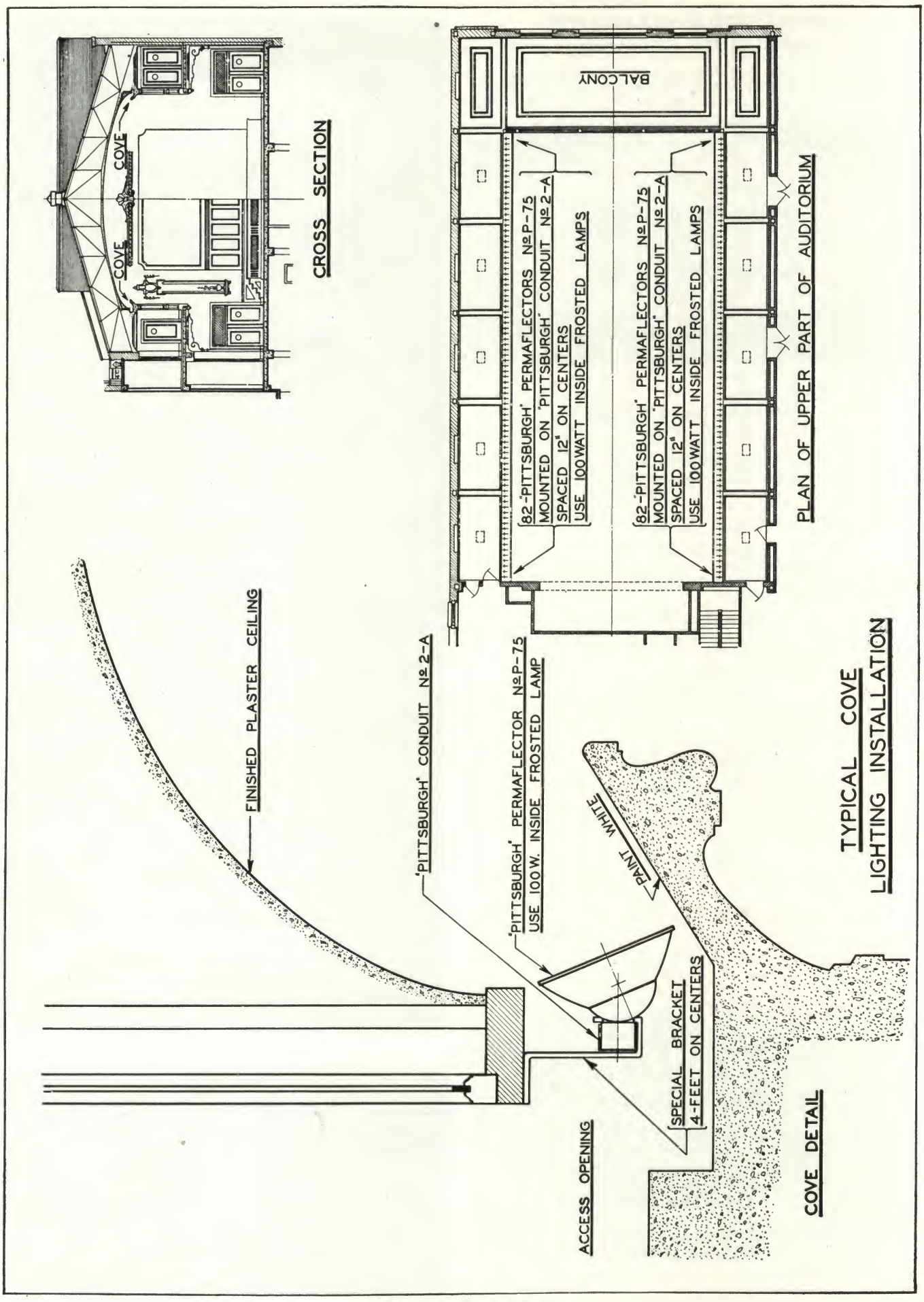

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INDIRECT LIGHTING

Indirect Lighting

That special adaptation of indirect lighting, commonly known as cove lighting, not only has all the advantages of other forms of indirect lighting but has the additional advantage of entirely concealing all lighting fixtures as well as the light sources.

Lighting problems have two aspects, the utilitarian and the aesthetic.

Industrial lighting is primarily for utilitarian purposes, with the possible exception of the higher class general and private offices; whereas window lighting, which is utilitarian in its important aspect, seeks pleasing aesthetic effects.

In this case the aesthetic contributes almost wholly to the utilitarian—the sales power of the show window. Therein window lighting differs from other forms of lighting.

Usually the aesthetic is something apart and different from the utilitarian, and in many instances the strictly aesthetic is not utilitarian at all.

The controversy that has been going on for years between the architect and the interior decorator on the one hand, and the illuminating engineer on the other, results from the efforts on the part of the former to make the aesthetic the predominant feature of the lighting, whereas the engineer is often guilty of an almost brutal disregard for the aesthetic side in his search for highest utilitarian quality.

Obviously the best solution of any lighting problem, where both these aspects must be given due consideration, is the solution which provides effective illumination while at the same time conforming to aesthetic requirements. In arriving at this goal there must be some disposition to compromise on the part of the architect or interior decorator and the engineer.

Indirect lighting from cornices and coves offers an excellent solution, from this standpoint, of good lighting for many interiors such as church and theater auditoriums, ball rooms, lodge rooms, hotel and club dining rooms, library reading rooms, court rooms, fine store interiors and other similar interiors.

Many large interiors would be ruined architecturally by the installation of the host of lighting fixtures of the ordinary type that would be required for their proper illumination. With cove lighting it is possible to eliminate visible fixtures. The lighting units may be cleverly concealed within cornices and coves of the architectural design, wall and floor urns, and in other ways.

Planning the Lighting System

In designing a beautiful architectural work, the architect visualizes and keeps in his mind's eye the aesthetic effects he is striving to realize. While the lighting is only one factor in attaining this object, it nevertheless is a most important factor. Therefore, a good general idea of the type of lighting to be used should be determined upon early in the drawing of the plans.

Too frequently the important decisions concerning the lighting are not made until the building is too far advanced to permit of the best results. Obstacles which could have been avoided, had it been known what character of lighting would be used, may prevent the consummation of the desired happy combination of maximum lighting utility with beautiful aesthetic effects.

Moreover, if consideration of the lighting is postponed too long, it may be found that the electric wiring has not been properly placed and that it is insufficient in carrying capacity for the lighting requirements of the building.

Examples of Cove Lighting

Herein are shown photographs of a few of the manifold applications of cove lighting.

It will be noted that almost without exception the lighting is the making of the interior, in that it reveals the architectural details in a superb manner without fastening attention upon itself, as would be the case with lighting fixtures.

Moreover this form of illumination leaves little to be desired from the standpoint of the utilitarian inasmuch as it has long been recognized as the nearest approach to daylight in its beneficial effects upon the eye. Glare is very nearly, if not entirely, absent due to the low brightness of the source of light, which in effect is the ceiling and walls because the primary source, the lamp and auxiliary reflecting equipment, is concealed. Shadows are greatly softened because of the diffuse character of the illumination and hence annoyance and eye fatigue are reduced to a minimum.

"Pittsburgh" Cove Lighting System

Recognizing the important aesthetic and utilitarian service to be rendered to humanity by the development of this form of lighting the PITTSBURGH REFLECTOR COMPANY has for years been perfecting a line of reflectors and wiring devices to aid the architect in securing the very best cove lighting installation.

Flexibility and ready adjustability have been given especial consideration.

The various reflectors illustrated on Permaflector Pages 25 to 27 in this catalogue have been designed particularly for this important type of service, and to facilitate wiring "Pittsburgh" "Easy-to-Install" Conduit has been devised. (See Permaflector Pages 14 and 15.)

It is believed that the present line of cove lighting reflectors is reasonably complete and that cove lighting problems can be satisfactorily handled by the selection of the proper reflector from this group. When occasion may arise making necessary a new design of reflector, having new characteristic distribution, the architect may depend upon it that the PITTSBURGH REFLECTOR COMPANY will proceed with its development and manufacture without delay.

Engineered Cove Lighting

For the reasons already mentioned architects are urgently requested to permit our Engineering Department to co-operate with them as the design of the building proceeds, because through such co-operation they will be assured of superior results. First sketches submitted to us will give us sufficient information upon which to base a lighting recommendation.

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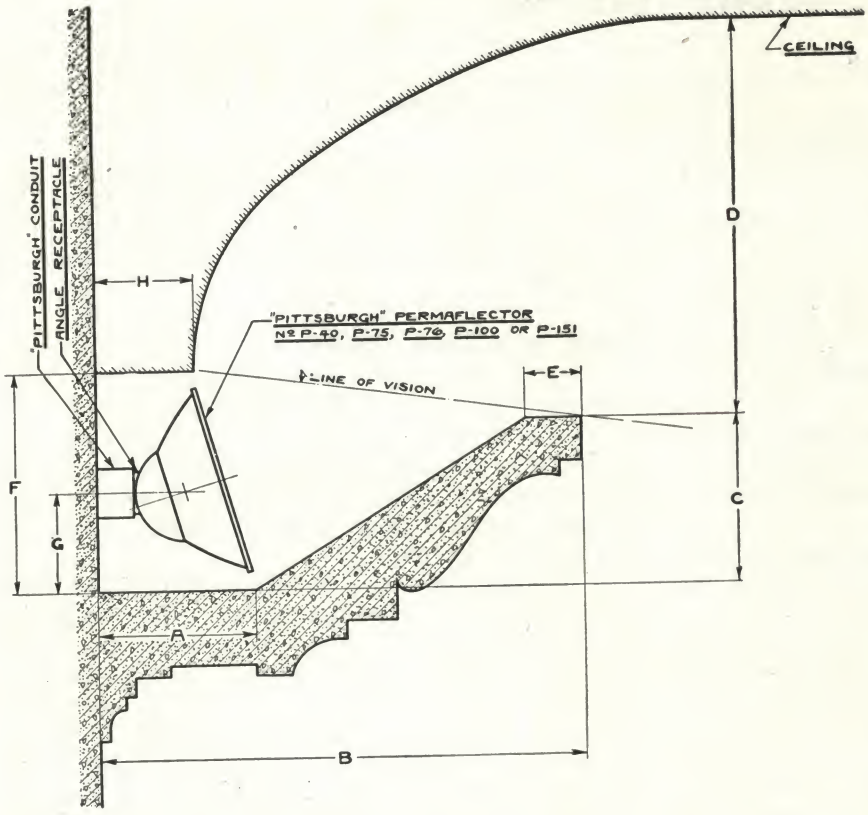
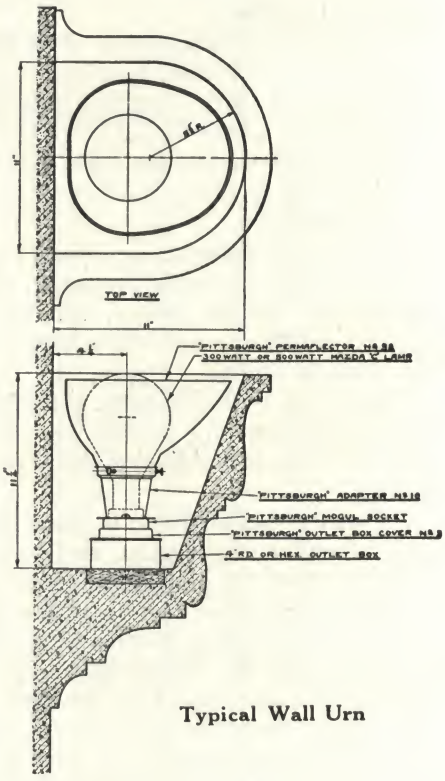


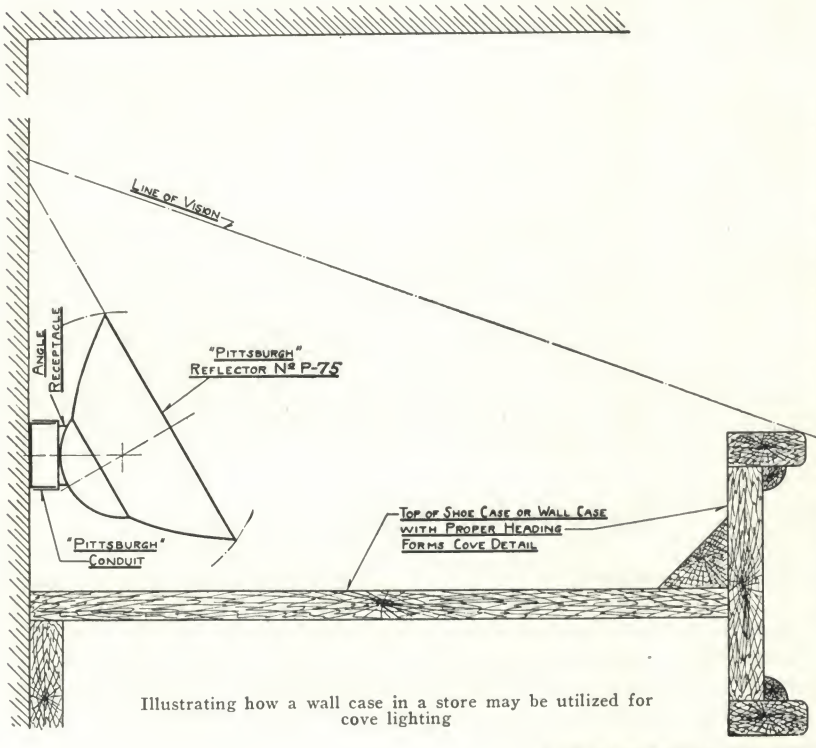


Typical Wall Urn

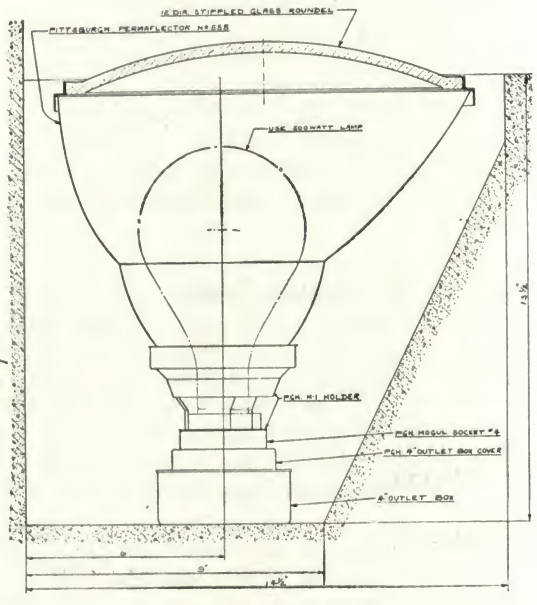
Information Required for Cove Lighting Recommendations

If our recommendations are desired, it is necessary for us to know the following dimensions:

Floor to ceiling.
Length of room.
Width of room.
Dimensions A, B, C, D, E, F, G and H.
Plan of cove, if not rectangular or circular.



Illustrating how a wall case in a store may be utilized for cove lighting

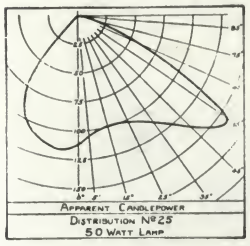


Typical Cove

Continued on next page

Permaflector No. 25

A very useful cove lighting reflector; lighting distribution throws out a maximum at 55° below the zenith, which permits placing cove close to ceiling.

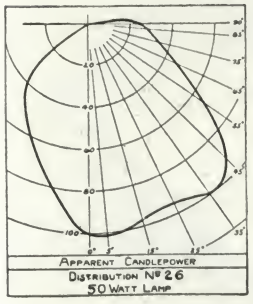


Lamp—25-watt A-19 or 50-watt mill type used with 2¼ in. Form "O" Holders. 50-watt A-21 used with 2¼ in. Form "H" Holder.

Dimensions—
Height ..... 4¼ in.
Width ..... 4¼ in.
Front to back of opening ..... 5 in.
Minimum spacing 4½ in. o. c.

May be used with Conduit No. 1 or Assemblies, Series B-1.

Permaflector No. 26



A show case reflector. Also for use in small coves, as in residences.

Lamp—25-watt A-19 (inside frosted) or 50-watt mill type.

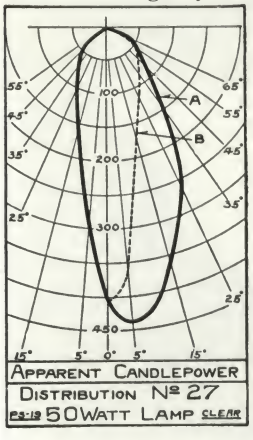
Holder—2¼ in. Form "O."

Dimensions—
Height ..... 3½ in.
Front to back..... 4 1/16 in.
Width ..... 4⅛ in.
Minimum spacing 4½ in. o. c.

May be used with Conduit No. 1 or Assemblies, Series B-1.

Permaflector No. 27

Primarily for tall and shallow wall display cases. Concentrating asymmetric distribution; with maximum candle power at 15°. Spacing should be 12 to 15 in. on center. Minimum 6½ in. on center.



Also useful for lighting small show windows, bank cages, bookcases, stock shelves, for cove lighting, etc.

Lamp—25-watt A-19, 50-watt A-19 or 50-watt mill type.

Holder—2¼ in. Form "O."

Dimensions—
Height ..... 3⅞ in.
Width ..... 6 in.
Front to back..... 6⅜ in.

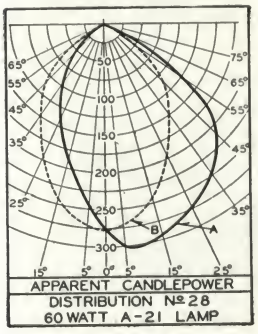
May be used with Conduit No. 1 or Assemblies, Series B-1.

Permaflector No. 28

Similarly to No. 27, Permaflector No. 28 is designed for tall and shallow wall display cases. It is concentrating, asymmetric in distribution, and maximum candlepower occurs at 10°.

Also useful for lighting small show windows, bank cages, book cases, stock shelves, side walls of gasoline service stations.

It differs from No. 27 primarily in that it is horizontal across the bottom opening, for flush mounting service. It has circular bottom opening, 5½ in. in diameter.



Lamp—25-watt inside frosted, or 50-watt mill type, use form "S" holder; 50-60-watt inside frosted lamp, use form "L" holder.

Dimensions—
Height ..... 3 7/8 in.
Diameter ..... 5½ in.
Minimum spacing 6 in. on centers; ordinary spacing from 9 to 15 in. on centers.

May be used with Conduit No. 1 or Assemblies, Series B-1.

Continued on next page

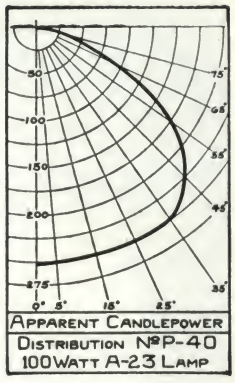
Permaflector No. P-40

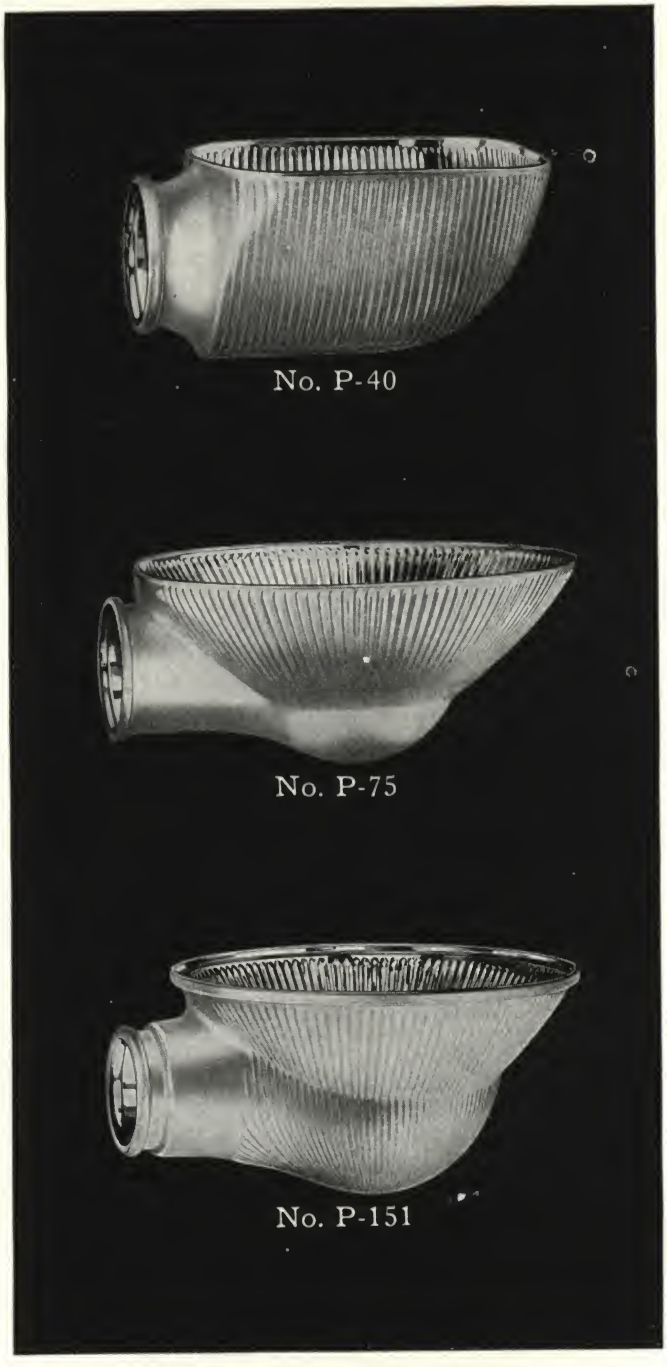
For indirect lighting from coves. Broad distribution. Minimum spacing, 8 in. on center. Also for lighting wall cases, bank cages, indirect lighting fixtures, art gallery lighting, etc.

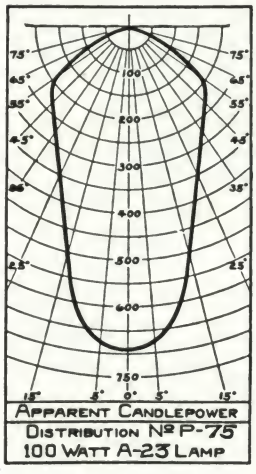
Lamp—50-watt and 60-watt A-21 (inside frosted) with 2¼-in. holder Form "O"; 100-watt A-23 (inside frosted) or 75-watt clear, with 2¼-in. Holder Form "H."

Dimensions—
Height ..... 2¾ in.
Width ..... 4¼ in.
Length ..... 5½ in.

May be used with No. 2 or No. 2-A Conduit or Outlet Box Assemblies, Series No. B-2.







Permaflector No. P-75

Designed primarily for indirect lighting from coves, where light must be thrown some distance and therefore a concentrated beam of light is desired. Also for indirect lighting fixtures, stock quotation boards, art galleries and also for small shallow windows where overhead room is limited and high intensity is desired. Minimum spacing 7¾ in. on centers.

Color-Lighting—(See Permaflector Page 21.) Color-Lite No. 4.

Lamp—100-watt A-23 (inside frosted) or 75-watt clear, 2¼-in. Holder Form "O."

Dimensions—
Height ..... 3 in.
Diameter ..... 6¾ in.

May be used with No. 2 or No. 2-A Conduit or Outlet Box Assemblies, Series No. B-2.

Permaflector No. P-151

Designed primarily for indirect lighting from coves, where light must be thrown some distance, and, therefore, a concentrated beam of light is desired.

Also for indirect lighting fixtures, rug racks, wall paper racks, wall cases, stock quotation boards, art galleries, and for small shallow show windows, where overhead room is limited and high intensity is desired. Minimum spacing 8¼ in. on centers.

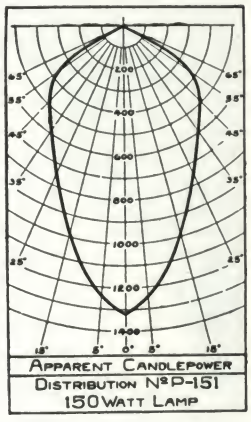
Color-Lighting—(See Permaflector Page 21.) Color-Lite No. 4.

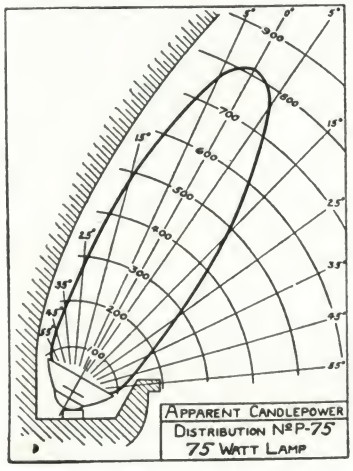
Lamp—150-watt clear.

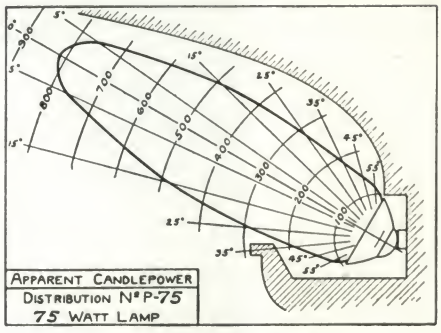
Holder—2¼ in. Form "O."

Dimensions—
Height ..... 3⅞ in.
Diameter ..... 6¾ in.

May be used with No. 2 or No. 2-A Conduit or Outlet Box Assemblies, Series No. B-2.

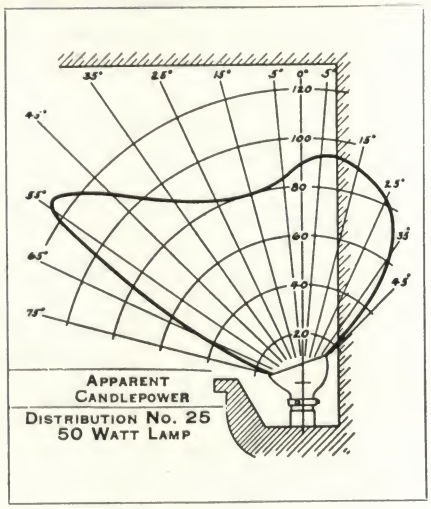






Typical Examples

Other typical examples of application of Permaflectors to cove lighting appear on Permaflector Pages 22 and 24. If our recommendations are desired, please give information as to dimensions (see Permaflector Page 24).



Continued on next page

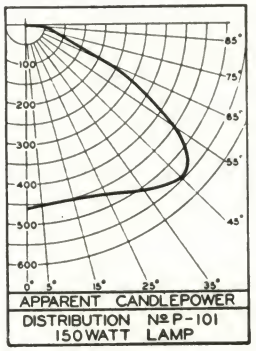
No. P-76

No. P-200

No. 71

Permaflector No. P-101

Same class of cove lighting as No. P-40 and No. P-76, particularly where large areas are to be lighted or greater absorption of light by surfaces of lower reflection factor must be counteracted by additional wattage. Also for indirect lighting fixtures and for special applications requiring high wattages within limited space. Minimum spacing, 9 in. Usual spacing, 12 in. o.c.



Color-Lighting—(See Permaflector Page 21.) Color-Lite No. 4.

Lamp—100-150-watt clear.

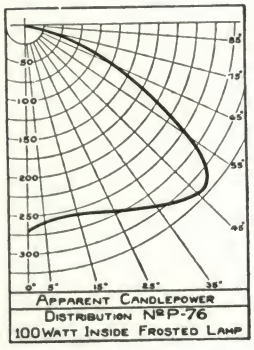
Holder—2¼ in. Form "O." (Or with 200-watt and 2¼-in. Form "H" holder.)

Dimensions—
Height .....3⅞ in.
Diameter .....6¾ in.
Length .....7¾ in.

May be used with No. 2 or No. 2-A Conduit or Assemblies, Series No. B-2.

Permaflector No. P-76

For indirect lighting from coves; distribution broader than No. P-40. Minimum spacing 7½ in. o.c. Also for indirect lighting fixtures and special applications where spacing is limited.



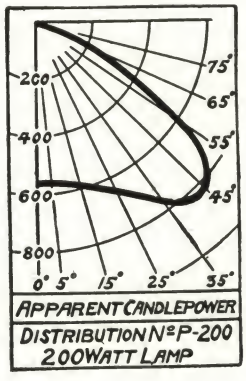
Lamp—50-watt A-21 (inside frosted) with holder 2¼ in. Form "O"; 100-watt A-23 (inside frosted) or 75-watt clear with holder 2¼ in. Form "H."

Dimensions—
Height .....3 in.
Diameter .....4¾ in.

May be used with No. 2 or No. 2-A Conduit or Assemblies, Series No. B-2.

Permaflector No. P-200

Primarily for cove lighting; broad distribution. Similar to No. P-101. Minimum spacing 10 in. o.c. Also for indirect fixtures, etc.



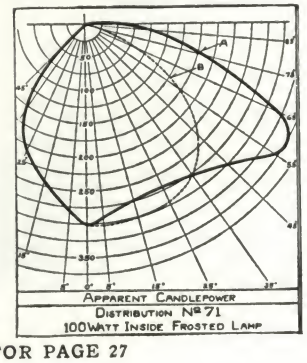
Lamp—100-150-watt clear with 2¼ in. Form "O"; 200-watt with 2¼ in. Form "H" holder.

Dimensions—
Height .....4¼ in.
Diameter .....7¼ in.
Length .....8 in.

Cannot be used with Conduit No. 2 or No. 2-A. May be used with Outlet Box Assemblies, Series No. B-2.

Permaflector No. 71

For wall cases, interior bulletin boards, paintings, cove lighting, stage footlights. Spacing recommended, 12 in. on center. May be placed as closely as 8 in.



Lamp — 100-watt A-23 (inside frosted) and 75-watt clear.

Holder—2¼ in. Form "H."

Dimensions—
Height .....5½ in.
Width .....5½ in.
Front to back.....6¼ in.
Center to back.....2¾ in.

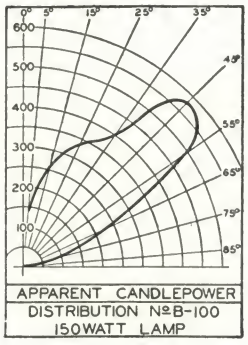
Receptacles must be not less than 3 in. from glass.

May be used with Conduit No. 1 or Assemblies, Series No. B-1.

Continued on next page

FOR INDIRECT FIXTURES

(Lamps Burning Base Up)



No. B-100

Lamps — 100-150-200-watt clear.

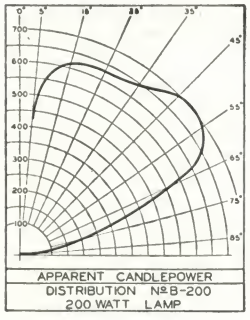
Dimensions—

Height ..... 5 in.
Diameter ..... 9 in.

Permaflectors B-200, B-501, B-1000 and B-1001

These have an exterior silvered surface which is deeply cross-fluted, in order to provide a smooth distribution of light over the ceiling. The interior of the glass, however, is smooth and, therefore, easy to clean and to keep clean; there are no deep wrinkles in which dust and dirt may lodge.

The distribution of light over the ceiling is extremely broad, the ceiling effect is beautifully smooth, uniformly graded, no sharp cutoff to the field of light, but a gradual fading away.

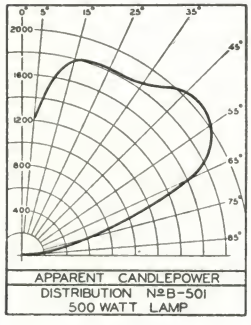


No. B-200

Dimensions—

Diameter ..... 9½ in.
Depth ..... 4¾ in.

To produce the light distribution indicated on the curve, center contact of base of 200-watt lamp must be 4⅞ in. above top rim of Permaflector.

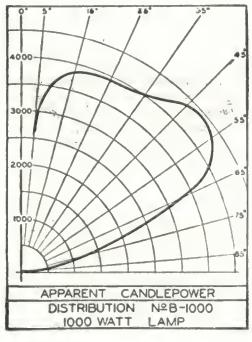


No. B-501

Dimensions—

Diameter ..... 12 in.
Depth ..... 6 in.

To secure the light distribution indicated on accompanying curve, center contact of base of 300 or 500-watt lamp must be 5⅜ in. above top rim of Permaflector.



No. B-1000

Dimensions—

Diameter ..... 16 in.
Depth ..... 8 in.

To secure the light distribution indicated on accompanying curve, center contact of 750-1000-watt lamp base must be 7¼ in. above top rim of Permaflector.

FOR URNS

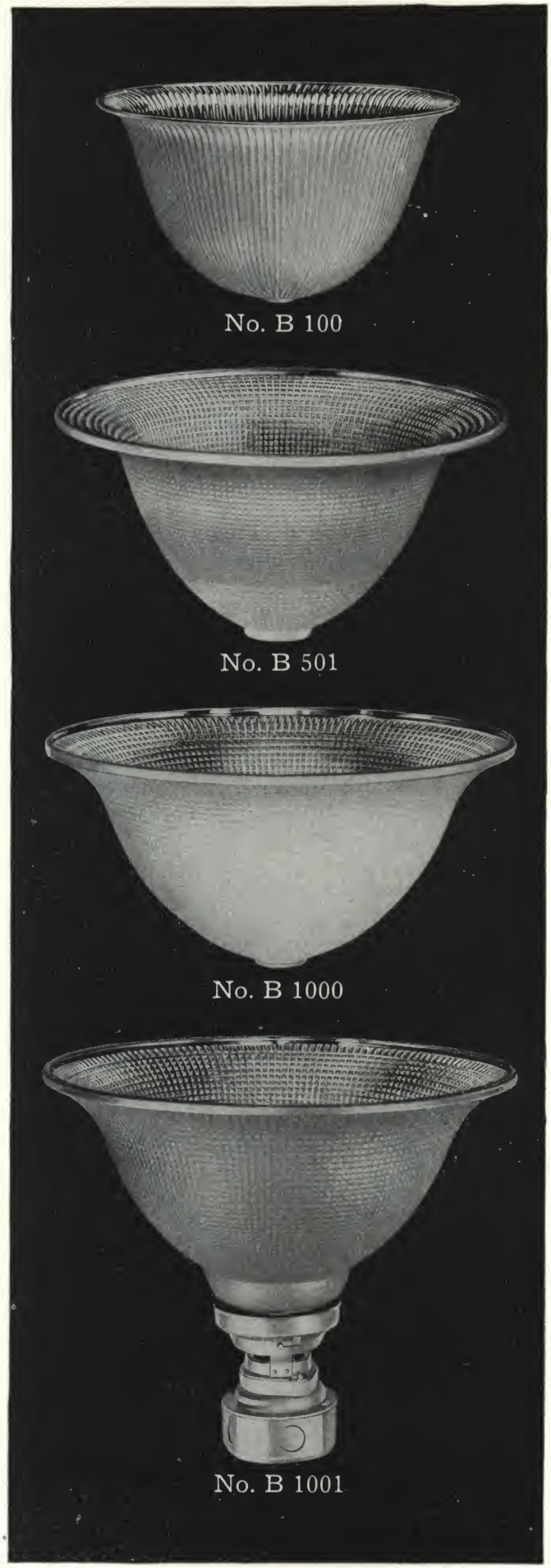
(Lamp Installed Base Down)

No. B-1001

For use in indirect urn-type Luminaires. Lighting distribution the same as B-1000.

Dimensions—

Diameter ..... 16 in.
Depth of reflector only ..... 8⅛ in.
Depth, complete with holder and 4-in. outlet box, as shown ..... 13⅝ in.



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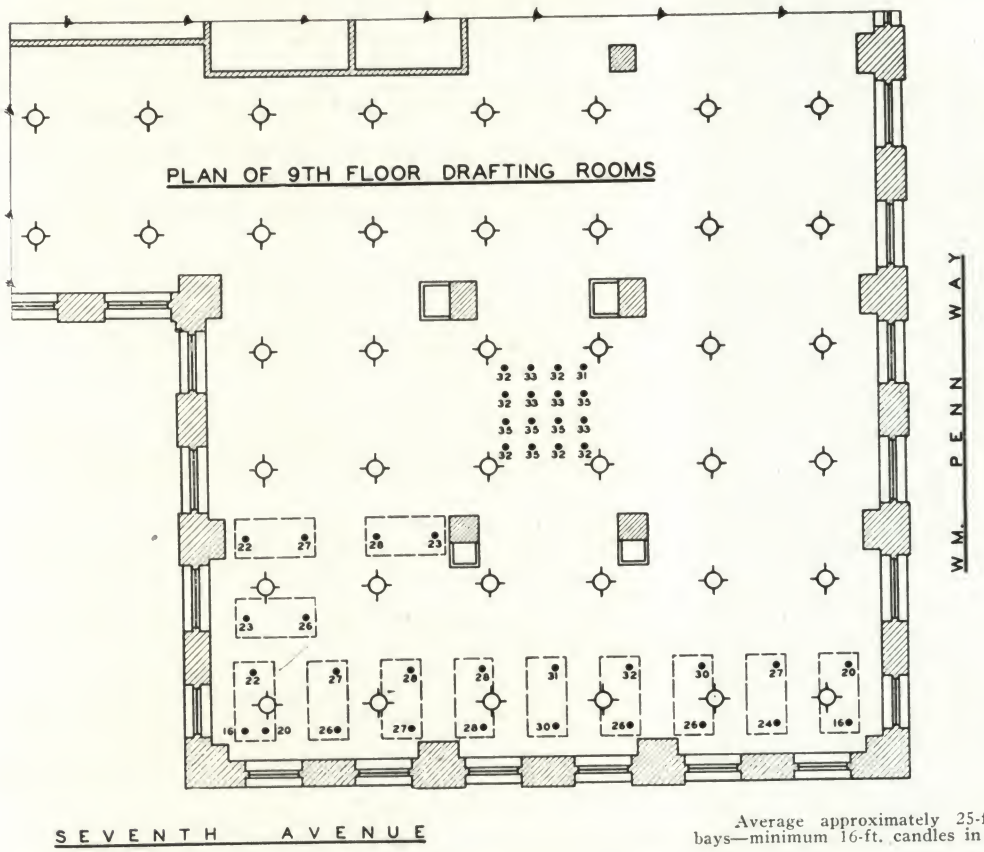
ILLUMINATION TESTS OF LUMINAIRE A-5 IN THE DRAFTING ROOMS, KOPPERS COMPANY, KOPPERS BLDG., PITTSBURGH, PA.



Average approximately 25-ft. candles—30-35-ft. candles in central bays—minimum 16-ft. candles in corners.

Description of Installation

Indirect Luminaire A-5—300-watt Mazda "C" lamp.

Suspension — Top of bowl to ceiling 30 in.

Spacing—8 to 9 ft. on centers.

Ceiling—11 ft. high, finished eggshell white.

Installation—New and clean.

Illumination Tests

Date—April 11, 1929—7:30 p. m.

Conducted By — John A. Hoeveler, E.E.

Test Condition — No natural light in room at time of test.

Instrument — Macbeth Illuminometer No. 63577.

Test Results—Illumination in foot-candles on horizontal plane 34 in. above floor at stations indicated.

One Section of a Drafting Room of Koppers Company, Pittsburgh, Pa.

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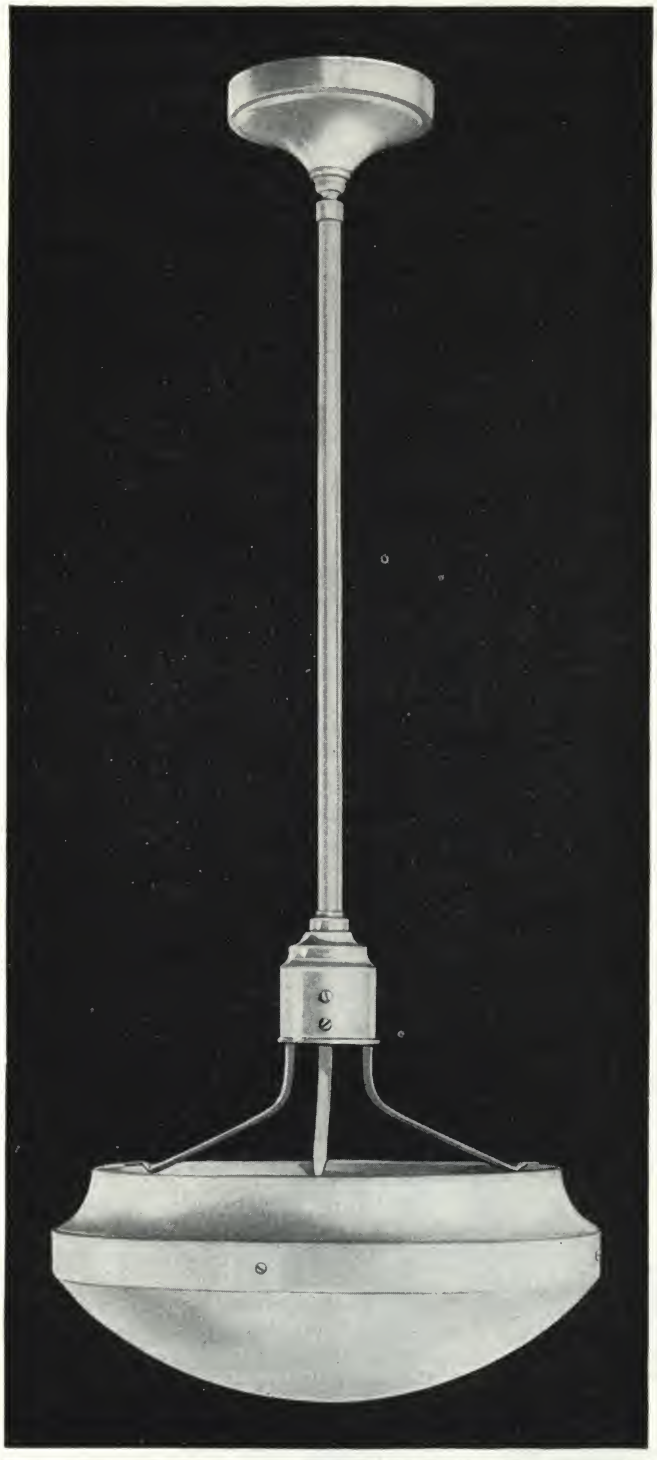


Indirect Luminaire A-5

(Patent Applied For)

Indirect Luminaire No. A-5 is designed primarily for commercial service, such as lighting of stores and offices.

The distribution of light over the ceiling is extremely broad, adequately covering a 20-ft. bay from a single central unit, with 30-in. suspension. The field of light is beautifully uniform; shadows from supporting arms are absent; and there is no sharp cutoff to the field of light, but a gradual fading away.

These unusual results are achieved by means of Permaflector No. B-501, designed for this purpose; at the same time, the design is such as to permit the lamp to be installed low in the reflector, thus reducing the exposure of the neck of the lamp.

Black supporting arms, black porcelain receptacle, and black finish inside of the socket husk, together with this low position of the lamp in the reflector, eliminate objectionable brightness of these elements and of the lamp neck.

The interior of the reflector is smooth and consequently it is easy to clean and to keep clean, which is a most important feature.

The sheet steel bowl is made of two pieces, telescoping one inside the other and held together by screws. This method of enclosing and fastening the reflector provides a very neat appearing fixture, one that looks just as good from above as from below.

Any one of the supporting arms may be disconnected and the bowl allowed to hang from the other two arms, for easy cleaning of the reflector (which is fastened in place and cannot drop out).

The Mogul Socket is enclosed in a sheet steel husk, which also serves as the means of supporting the bowl from the cold-rolled steel arms.

The husk is porcelain enameled, in order to make certain of a lasting finish on the husk, which becomes very hot in service; the porcelain enameling matches the ivory Duco finish of the fixture, both as to color and lack of glaze.

A stem support with swivel joint at canopy is used, thus doing away with the chain and at the same time insuring that the fixture will hang pendant.

The swivel stem support is considerably better looking than chain, and can more readily be kept free from dirt accumulation.

The sheet steel canopy is harmonious in design with the bowl and is arranged for supporting from fixture stud in outlet box.

The finish is a rich ivory, which will harmonize well with most any store or office interior.

The distinct points of advantage of Luminaire A-5 are:

(1) Easy assembly and wiring and installation.

(2) Very much improved light distribution.

(3) Elimination of support shadows.

(4) Elimination of sharp cutoff of field of light.

(5) Elimination of peeling of finish on husk.

(6) A much better design, and consequently very much improved appearance.

(7) Easy maintenance of reflector.

(8) Swivel joint at canopy—luminaire hangs pendant.

(9) A Luminaire equipped with a Permaflector unconditionally guaranteed for 10 years.

The fixture is designed for use with 300 and 500-watt general service, incandescent lamps.

Dimensions—

Diameter of bowl	16 in.
Depth of bowl	6½ in.
Diameter of canopy	6 in.
Suspension, top of bowl to ceiling	30 in.

Reflector is Permaflector No. B-501, which is 12 in. in diameter and 6 in. deep. (See illustration at right; also Permaflector Page 28.)

Illumination Design Data

Spacing between units should not exceed ceiling height for ceilings 12 ft. or less. For higher ceilings, spacing may exceed ceiling height, but not by more than 25 per cent.

For good office lighting, approximately 10 foot-candles, use 300-watt lamps up to 12-ft. spacings.

For greater spacings, or where higher illumination is desired, use 500-watt lamps.

Continued on next page

Indirect Luminaires No. B-2 and B-5 (Patent Applied For)

Pittsburgh Indirect Luminaire A-5 was brought out more than a year ago to satisfy an insistent demand for a better indirect fixture for commercial and office lighting. As a part of this unit, we developed the new Permaflector B-501, with its broad, smooth, efficient distribution of light over the ceiling. Permaflector No. B-200 for the 200-watt lamp and Permaflector B-1000 for the 750 or 1000-watt lamp followed.

Indirect Luminaire A-5 incorporates unusually fine design features and naturally it commands a price commensurate with its quality.

There is, however, a considerable market for a lower priced line of indirect luminaires. Pittsburgh Indirect Luminaires B-2 and B-5 are offered for this field. The lowering of the cost of production has been accomplished entirely in the fixture. The same Permaflectors, B-200 and B-501, respectively, are employed as in the DeLuxe Type A Luminaire. In other words, customers who want efficient, properly distributed indirect illumination may now have it at very low cost for fixtures.

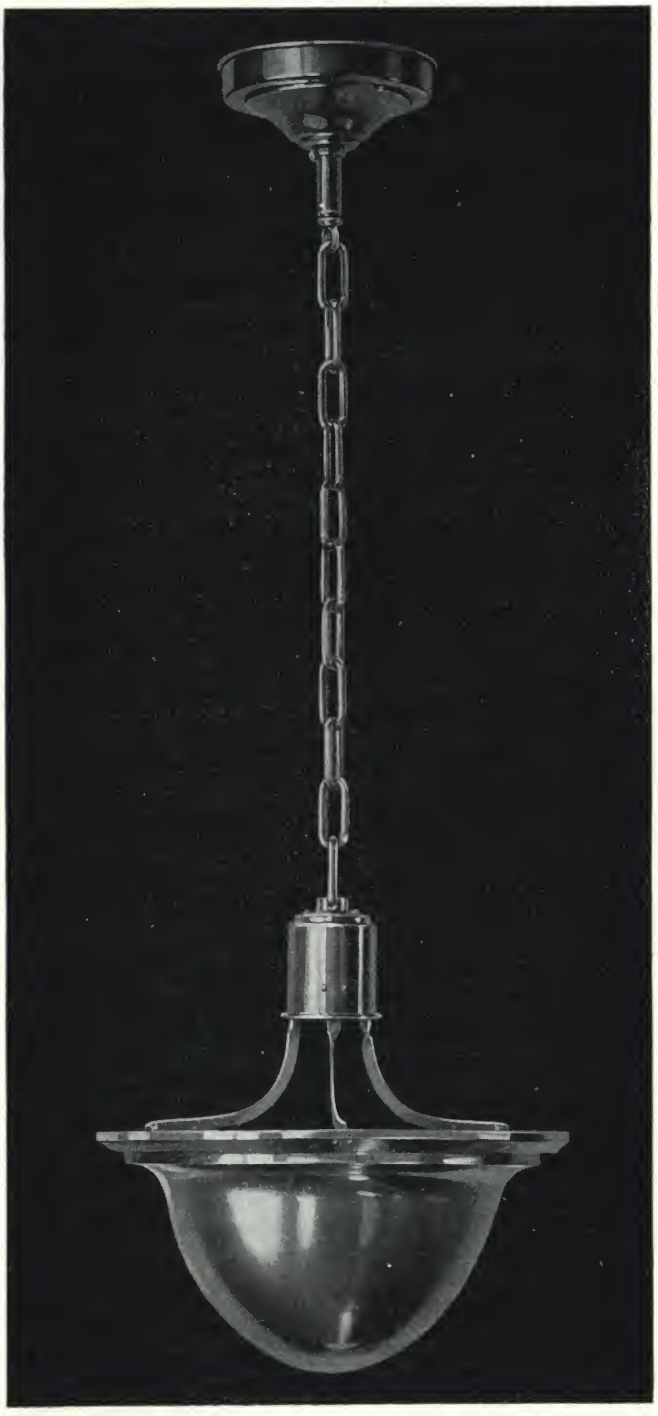
Indirect Luminaires B-2 and B-5 consist of spun copper bowls, of the design indicated, suspended from the spun copper husk enclosing the socket, by means of detachable steel arms. Canopy is of spun copper; stem of brass tubing; chain of steel. All external parts of fixture are finished in dark monumental bronze.

Sufficient chain is provided to make possible a length of suspension from top of bowl to ceiling of 36 in. This will usually be more than desired. Consequently, chain may be shortened to secure the desired length of suspension by removing as many links as may be necessary for a particular job.

Indirect Luminaires B-2 and B-5 can be maintained just as conveniently as Indirect Luminaire A-5. Any one of the three supporting arms may be detached and the bowl swung free of the lamp on the two remaining arms. This permits easy cleaning of the smooth interior surface of Permaflectors B-200 or B-501.

Bowl Size	*Diameter*	*Depth*
No. B-2	11⅛ in.	5⅞ in.
No. B-5	13¾ in.	7 in.

Note: These are standardized units available only as described above. They can be furnished in other finishes only on special order in those cases where large quantities are involved.



Permaflector Luminaires No. A-5 or No. B-5 Are Ideal for Office Lighting

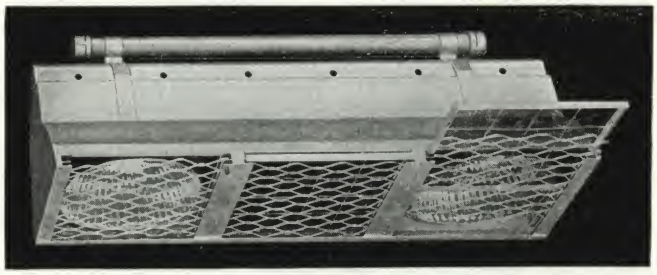
Permaflector Luminaires No. A-5 or No. B-5 Provide Even, Shadowless Light for Drafting Rooms

Continued on next page

FOR THE STAGE

"Pittsburgh" Theater Border Light

Consists of heavy gauge sheet metal housing, pipe hanger extending full length of each unit, slide for guard of expanded metal and slide for Color-Lite frame containing gelatin. Glass Color-Lites also available.



Pittsburgh Theater Border Light 3 Ft. Long

Provides fine light control and efficiency, at no increase in operation cost over ordinary border lights of low efficiency.

"Pittsburgh" Theater Border Light completely protects the silvered glass reflectors with the heavy gauge metal housing and expanded metal guard beneath.

Built in any length; in sections, when more than 25 ft. long. Specifications for 300 to 500-watt border lights for very large theaters available on request.

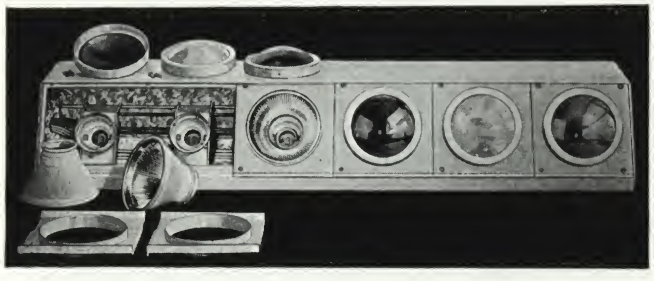
Border Light No. 1—For use with either 100 or 150-watt lamps, spaced 12 in. on centers. Over-all height, 14½ in., width 10½ in.

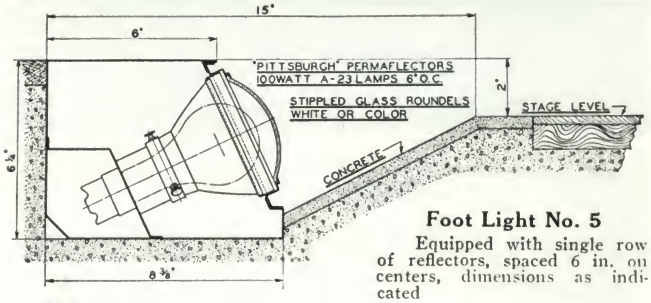
Border Light No. 2—For use with 200-watt lamps, spaced 12 in. on centers. Over-all height, 16 in., over-all width, 11½ in.

Border Light No. 3—For 300-500-watt lamps, 12 in. on centers. Over-all height, 17 in.; width, 11½ in.

"Pittsburgh" Theater Foot Lights

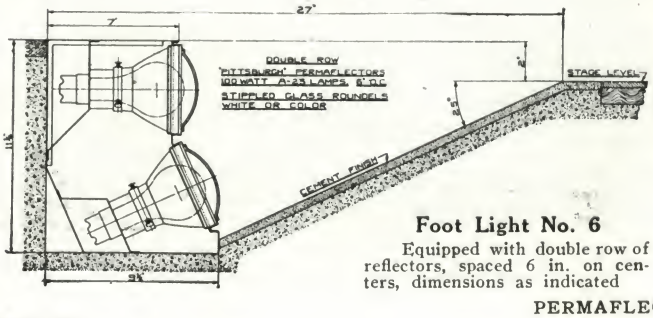
Equipped with highly efficient Permaflectors, set inside a heavy gauge continuous metal housing strong enough to support the weight of an actor.





Foot Light No. 5

Equipped with single row of reflectors, spaced 6 in. on centers, dimensions as indicated



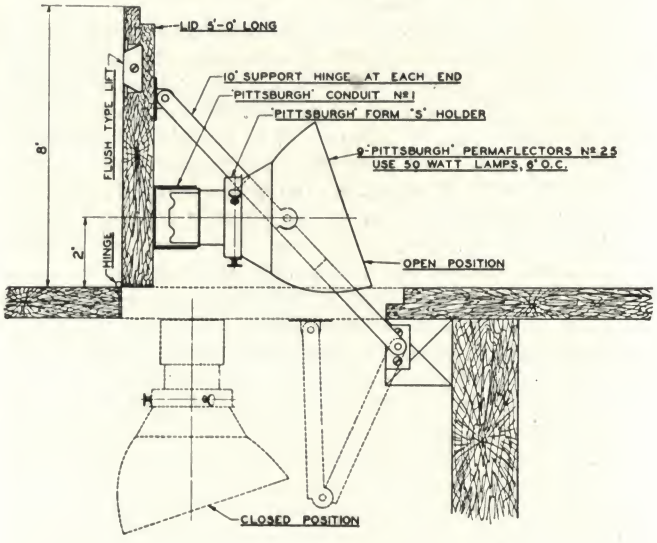
Foot Light No. 6

Equipped with double row of reflectors, spaced 6 in. on centers, dimensions as indicated

Pittsburgh Foot Light is completely enclosed, self-contained, dusttight. The convex glass roundels are easily removed to renew lamps. Front plate containing roundels may be removed in sections to get at the wiring. With this enclosed, dusttight foot light, the lamps and reflectors are always protected against the accumulation of dust and dirt.

When specifying either No. 5 or No. 6 Pittsburgh Foot Light, architects should detail them as indicated below, thus requiring the general contractor to build the stage so that the Pittsburgh Foot Light will accurately fit into place.

Disappearing Foot Light No. 8

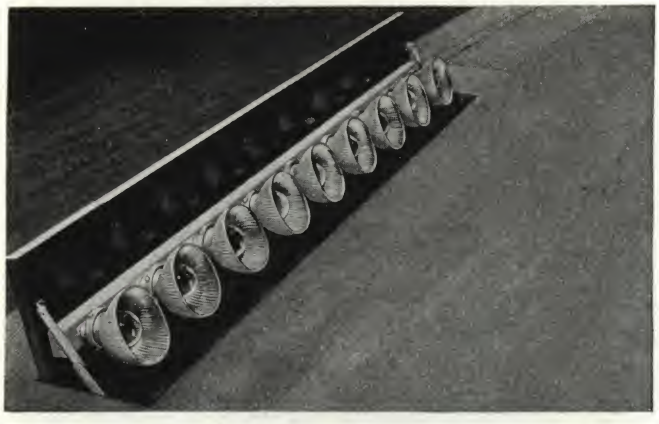


For those schools having stage in the auditorium for which a disappearing foot light is desired, but who can not afford Disappearing Foot Light No. 7, we recommend Disappearing Foot Light No. 8. It consists of 5 ft. by 8-in. hinged sections in the floor, constructed as shown. These should be equipped with 10-in. support hinges at each end and a flush type of lift.

Attached to the bottom of the hinged lid, at the location shown, is a 5-ft. length of Pittsburgh "Easy-to-Install" Conduit No. 1, equipped with 9 receptacles, spaced 6 in. on centers as shown, 2¼-in. Form "S" shade holders, and 9 Pittsburgh Permaflectors No. 25, equipped with 50-watt lamps.

The school authorities to arrange with the carpenter contractor for construction of these hinged sections in accordance with the detail here shown.

Electrical contractor may furnish and install the "Easy-to-Install" Conduit and Permaflectors.



This foot light was first worked out for St. Augustine's Academy, Cleveland, Ohio. It is very successful as a lighting unit, but of course does not possess the ruggedness and practical features of Foot Light No. 7.

PERMAFLECTOR PAGE 32

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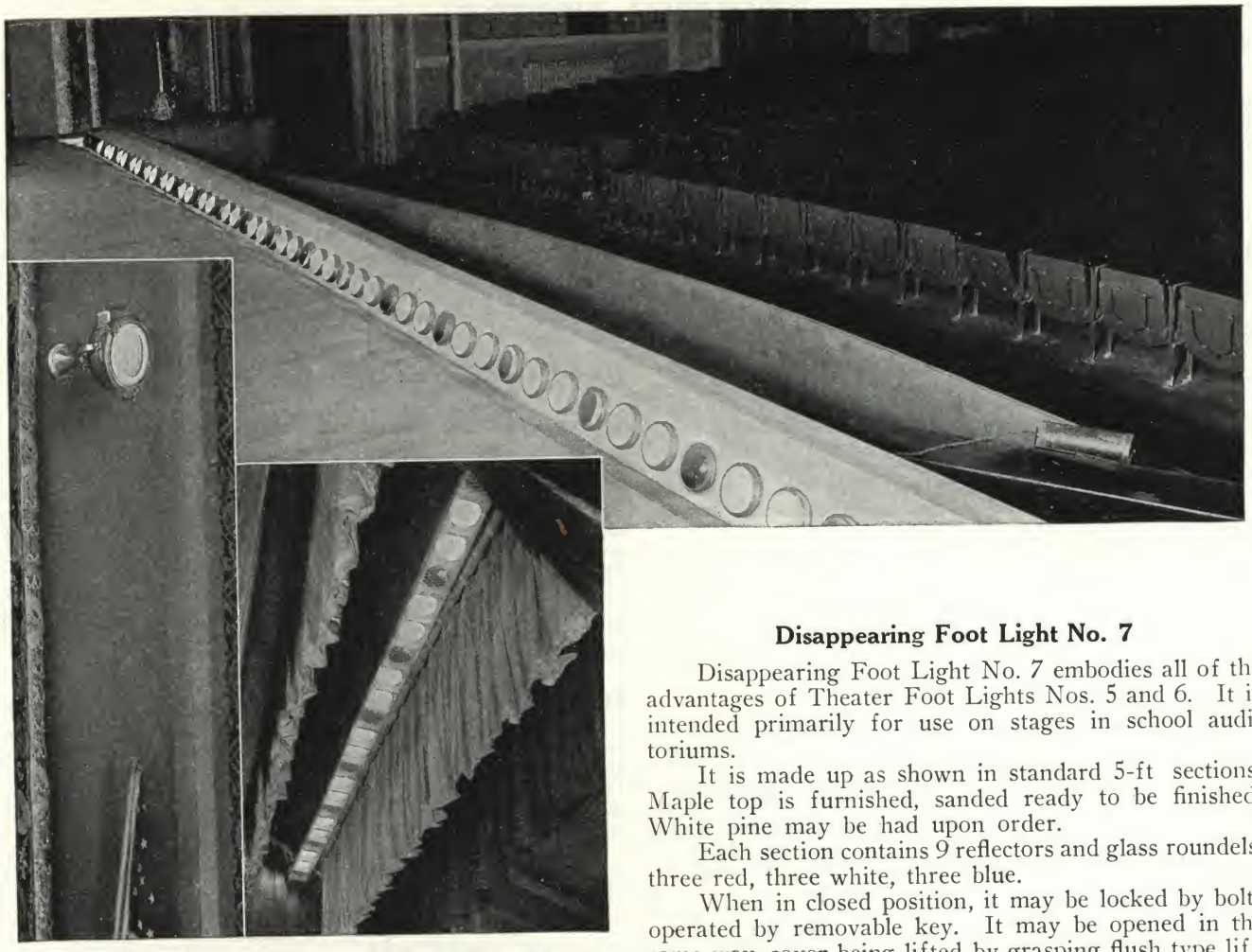


Above Illustrates Border Light No. 1; No. FLC-250 Used as an Emergency Light; and Foot Light No. 5

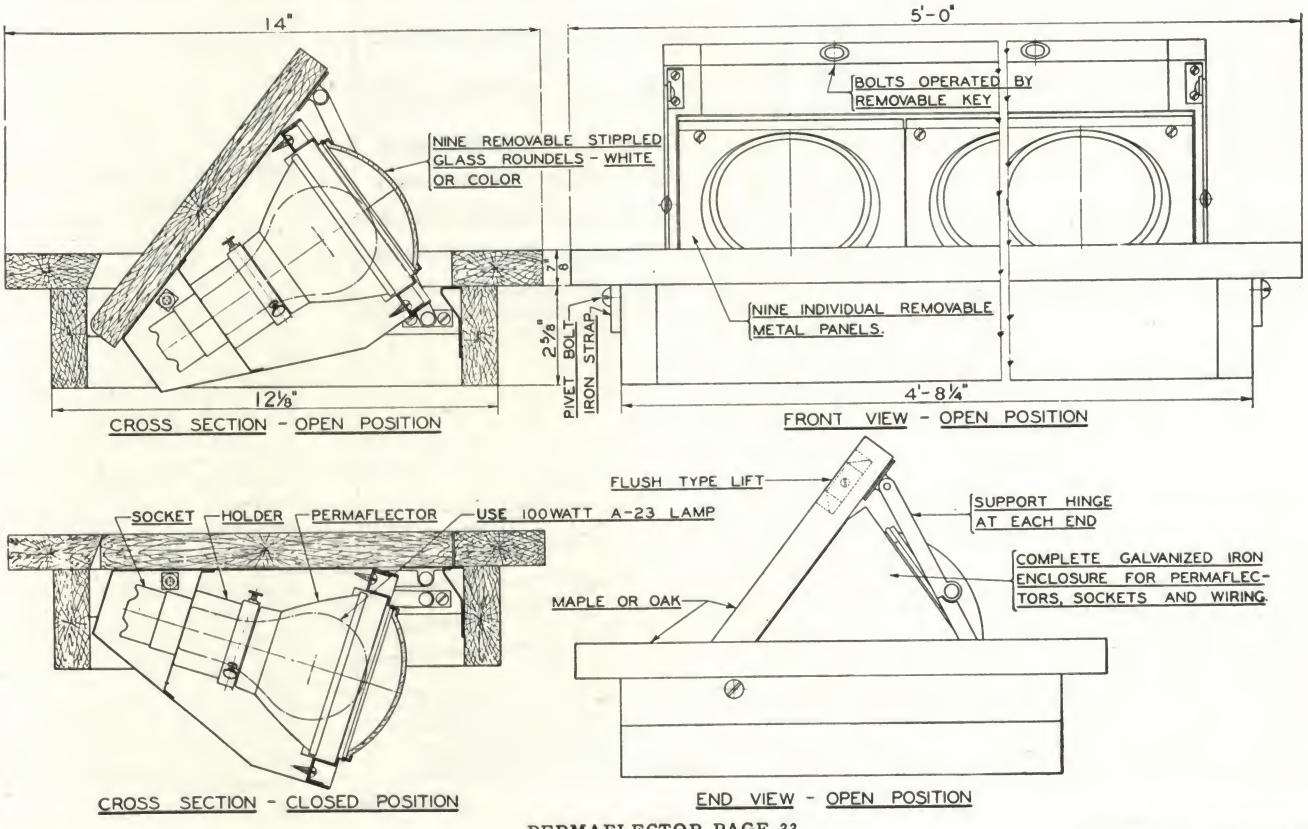
Disappearing Foot Light No. 7

Disappearing Foot Light No. 7 embodies all of the advantages of Theater Foot Lights Nos. 5 and 6. It is intended primarily for use on stages in school auditoriums.

It is made up as shown in standard 5-ft sections. Maple top is furnished, sanded ready to be finished. White pine may be had upon order.

Each section contains 9 reflectors and glass roundels, three red, three white, three blue.

When in closed position, it may be locked by bolts operated by removable key. It may be opened in the same way, cover being lifted by grasping flush type lift. Cover is held open by support hinge at each end.



PERMAFLECTOR PAGE 33

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INDUSTRIAL LIGHTING

Importance of Good Factory Lighting

It has been said that the use people make of illumination is a measure of their progress. For thousands of years the human race struggled along with artificial sources of light of puny lightgiving ability, with the result that no work requiring close vision could be done except during the hours of daylight. During this time mechanical invention and science lagged.

In the past half century, however, there has been more development in lighting than in all the ages before, since man first used a brand from the fire to light his way at night. Significantly, this rapid advance in artificial lighting methods was accompanied by the most astounding material development of the world.

Conservation of Eyesight

Lengthening the hours during which close work can be done has brought with it some disadvantages, however; (1) unusual and unnatural demands have been placed upon the eye; (2) the eye has not always been able to adjust itself to these increased demands of close vision, because artificial illumination has not always been intelligently adapted to assist the eye in carrying its added burden. Thus it is evident that the lighting problem is one of greatest importance from the standpoint of conservation of vision.

Because diminution of eyesight due to working with insufficient and improperly applied illumination takes place gradually, it may take a person years to become aware of it, which makes it important to guard against the insidious effects of dim illumination, of glaring light sources shining in the eyes, of flickering lights, of sharp shadows and of glare reflected from polished parts of the work.

Accident Prevention

Experience has also demonstrated that insufficiently and improperly applied illumination is a prolific cause of industrial accidents. In the past few years numerous investigators studying the cause of accidents have found that the accident rates in plants with poor lighting is higher than similar plants which are well illuminated. Moreover, factories which have installed improved lighting have experienced reductions in their accidents which have proved very gratifying.

In any compilation on accident statistics, every known cause may be given except faulty lighting, either as a direct or indirect cause. Yet it must be perfectly evident that inadequate illumination increases the possibility of accidents.

Attention was first directed to this when it was discovered that the number of fatal accidents in December and January, months of fewer daylight hours, was materially higher than during the summer months.

State Lighting Codes

As a matter of fact, the number of industrial accidents which were traceable to poor illumination reached such a figure some years ago that a number of states adopted industrial lighting codes which specifically set forth the minimum lighting requirements permissible for the various manufacturing processes.

Increased Production

It is also a demonstrable fact that poor lighting reduces the output of a factory. Without illumination the most skilled mechanic operating the most efficient machine can turn out no work at all. With a little illumination some work, frequently of inferior quality, will be produced at great hazard to both man and machine; but with adequate illumination the maximum work will be produced with less spoilage and less chance of accidents.

About the most inconsistent thing the plant manager can do is to equip his shops with expensive machinery, employ expert mechanics and then fail to supply adequate illumination, the most essential factor in securing high man-efficiency.

That improved illumination actually has a marked effect in increasing production has been ascertained by numerous carefully conducted tests during the last ten years. Such tests were made in a variety of industries, including the coarse industrial processes requiring no close vision, as well as fine processes requiring the closest of vision. In every instance considerably more production resulted from the better illumination and spoilage was decreased.

Evidently illumination is a most important instrument of production.

Other Desirable Attributes of Good Lighting

In addition to making for lesser eyestrain, reduction of accidents, increased production and less spoilage, better lighting also makes for greater accuracy in workmanship, promotes better working and living conditions thereby making workmen more contented, better order and neatness in the plant, easier supervision of employees and most important of all, reduces labor turnover.

While at one time employers gave but slight consideration to a continual changing of employees, today it is recognized that excessive labor turnover disrupts an industrial organization and lowers its efficiency.

Design of "Pittsburgh" Industrial Lighting Reflectors

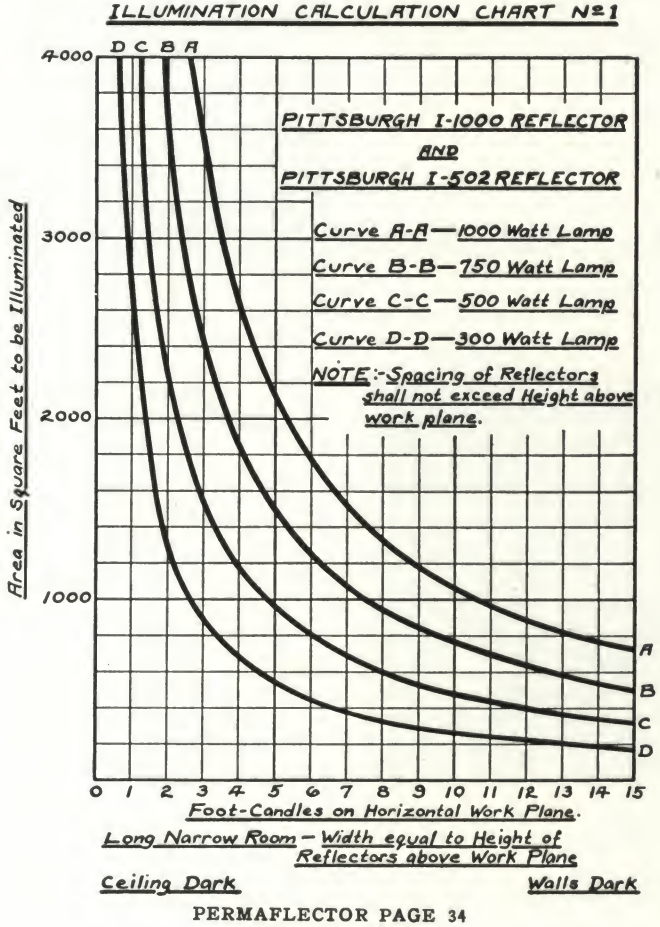
Factory lighting, in order to accomplish the foregoing beneficial results, must conform to a number of fundamentals as follows: (1) adequate intensity of illumination at the work; (2) proper shading of lamps to minimize glare; (3) reasonably uniform distribution of light on the work; (4) absence of excessive brightness contrast within the field of view.

(1) Adequate intensity is a matter of selecting the proper size and spacing of lighting units, having due regard for their efficiency.

(2) "Pittsburgh" reflectors are designed on the principle of concealing the electric lamp so as to provide the requisite degree of shading.

(3) Uniformity will be obtained through proper mounting and spacing of lighting units.

(4) Excessive contrasts are avoided through the use of light-colored ceilings and medium-colored walls.



Industrial Lighting Calculations

In order to assist users of "Pittsburgh" Industrial Lighting Reflectors to choose the proper size of lamp and reflector, mounting height and spacing between reflectors, for the various conditions of industrial lighting service, illumination calculation charts have been prepared.

The first step in planning the lighting for any industrial interior is to determine what intensity of illumination is necessary. In states where Industrial Lighting Codes are in effect, the minimum permissible intensities are specified in such Codes. Practically all of these Codes are based upon the code of lighting for factories, mills and other work places, prepared by the Illuminating Engineering Society. Rule I of this Code requires the illumination maintained to be not less than tha given in the following:

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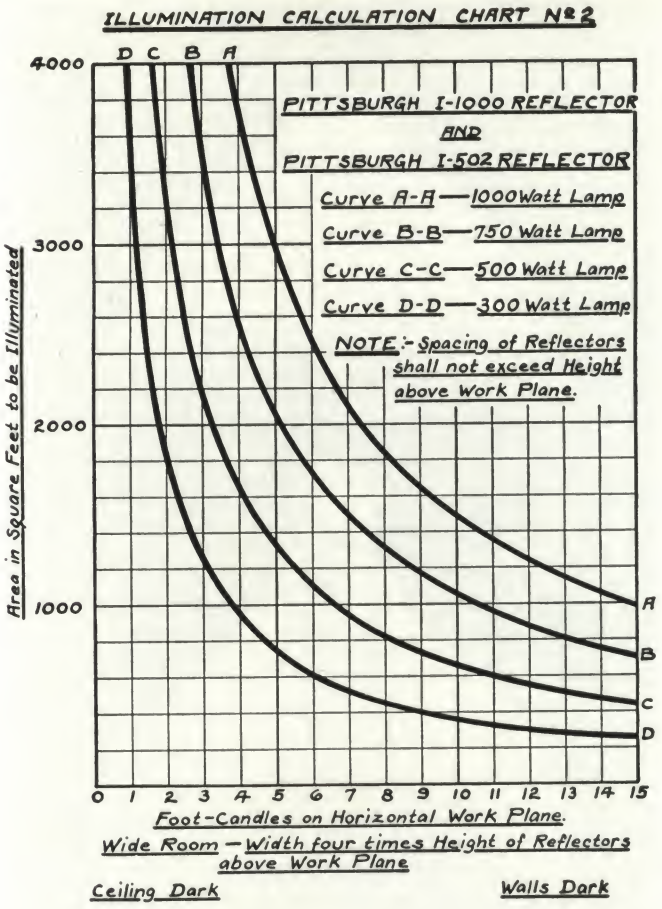


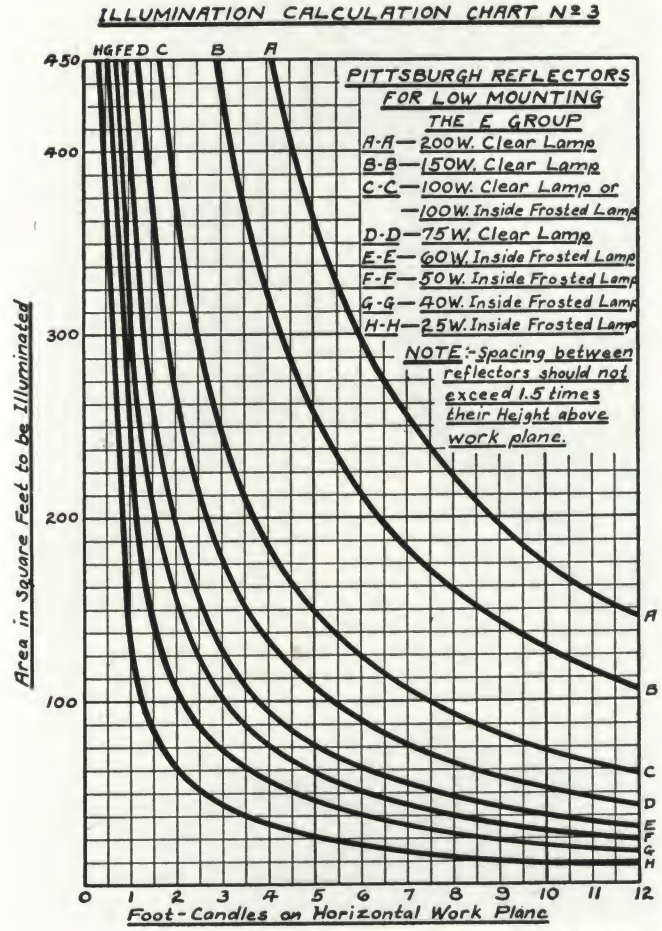


TABLE II

(a) Roadways; yard thoroughfares	0.02
(b) Storage spaces; aisles and passageways in workrooms excepting exits and passages leading thereto	0.25
(c) Where discrimination of detail is not essential. Spaces, such as: hallways, stairways, exits and passages leading thereto; toilet rooms; elevator cars and landings. Work, such as: handling material of a coarse nature; grinding clay products; rough sorting; coal and ash handling; foundry charging.	0.5
(d) Where slight discrimination of detail is essential. Spaces, such as: stairways, passageways, and other locations where there are exposed moving machines, hot pipes or live electrical parts. Work such as rough machining, rough assembling; rough bench work; rough forging; grain milling.	1.
(e) Where moderate discrimination of detail is essential. Work, such as: machining; assembly work; bench work; fine coremaking in foundries, cigarette rolling.	2.
(f) Where close discrimination of detail is essential. Work, such as: fine lathe work; pattern making; tool making; weaving light-colored silk or woolen textiles; office work; accounting; typewriting.	3.
(g) Where discrimination of minute detail is essential. Work, such as: watchmaking; engraving; drafting; sewing dark colored material.	5.

It should be noted that the foot-candle values of Table II are minimum legal requirements. They represent only a sufficient intensity of illumination to prevent accidents and undue eyestrain. In order to gain the other advantages of better lighting, most important of which is increased production, intensities equal to two or three times the minimum values will be found necessary.

In general, industrial interiors may be divided into two classes, i. e. (1) high interiors (ceilings 15 ft. or more); (2) low interiors (ceiling less than 15 ft.). For high interiors "Pittsburgh" concentrating reflectors No. I-500 and No. I-1000 provide efficient lighting because of their ability to concentrate light on the work plane from high elevations.

For low mounting purposes, "Pittsburgh" distributing reflectors designated by the letter "E" should be used.

After determining the desirable intensity of illumination to be supplied to the work, the next step is to determine proper spacing between reflectors, which is dependent upon the mounting.

In general it is desirable to mount reflectors as high as practicable, care being exercised not to install them above beams and belting, shafting, etc.

In the case of high mounting reflectors No. I-500 and No. I-1000, the maximum spacing between reflectors should not exceed their height above the work plane; whereas the distributing reflectors, designated by the letter "E" may be spaced somewhat further apart, but in no case should the spacing exceed 1.5 times the height of the reflectors above the work plane.

Charts 1 and 2 apply to reflectors for high mounting. In the case of long narrow rooms, where the width of the room is about equal to height of reflector above work plane, Chart No. 1 should be used, whereas for wide rooms where the width of the rooms is three to four times the height of the reflectors above the work plane, Chart 2 should be used. The purpose of these charts is to enable users of "Pittsburgh" Reflectors No. I-1000 and No. I-500 to select the proper size of lamp to give a predetermined illumination on the horizontal work plane in a given area. Curves AA refer to the 1000-watt lamp; curves BB, to the 750-watt lamp; curves CC, to the 500-watt lamp; curves DD, to the 300-watt lamp. It is assumed that the space between reflectors will not exceed their height above the work plane. The horizontal scale gives the foot-candles illumination on the horizontal work plane, whereas the vertical scale to the left, gives the area in square feet to be illuminated.

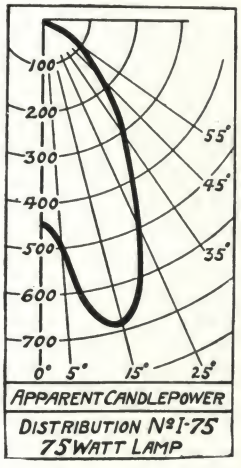
Example: Assume an industrial interior 400 ft. in length by 100 ft. in width, with reflectors mounted 25 ft. above the work plane. Under this condition the maximum spacing between reflectors would be 25 ft. and each of the required 64 units would illuminate an area 25x25 or 625 sq. ft. If 10 foot-candles are desired on the horizontal work plane, locate the intersection of the 10 foot-candle line of Chart 2 with the 625 sq. ft. area line. It will be noted that this point is close to the CC curve, which means that 500-watt lamps, equipped with No. I-500 Reflectors spaced 25 ft. apart, at an elevation of 25 ft. above the work plane will result in slightly more than the desired illumination of 10 foot-candles.

Chart No. 3 gives similar curves for "Pittsburgh" reflectors intended for low mounting service. Assume an industrial interior 100 ft. long by 60 ft. wide locating reflectors approximately 10 ft. from the floor. Usually the work plane of an industrial plant is about 36 in. from the floor. Consequently reflector height above the work plane would be 7 ft. and the maximum permissible spacing between units would be 1.5 times 7, or 10.5 ft. Taking an even 10 ft. spacing between units in both directions makes a symmetrical arrangement. Under these conditions each lamp and reflector will illuminate 100 sq. ft., requiring sixty units.

Continued on next page

Assume further that the operation is one where moderate discrimination of detail is essential, and that 7 to 8 foot-candles will be desirable. Referring to Chart 3 it is noted that the intersection of the 8 foot-candle line with the 100 sq. ft. area line occurs very close to curve CC. This means that the 100-watt inside frosted or clear lamp, equipped with the proper reflector will give from 7 to 8 foot-candles on the horizontal work plane. If the 100-watt inside frosted lamp is used, Reflector No. E-75 should be used, whereas if the 100-watt clear lamp is used, Reflector No. E-100 is recommended.

Permaflector No. I-75



APPARENT CANDLEPOWER
DISTRIBUTION No I-75
75 WATT LAMP

An intensive type for low mounting localized industrial lighting (5—12 ft. above work plane). Also for ornamental direct lighting fixtures such as Gothic lanterns for churches; for flush mountings in low ceilings; also certain shallow show windows.

Flush Mounting Ring No. 55—(See Permaflector Page 19.)

Lamp—100-watt A-23 (inside frosted) or 75-watt clear.

Holder—2¼ in. Form "H."

Dimensions—

Height .....4¾ in.
Diameter .....8⅜ in.

Permaflector No. I-505

Designed for high bay industrial lighting where the lighting equipment is located 25 feet or more above the floor. Also for lighting through skylights as in art galleries, bank lobbies and similar applications.

For industrial lighting the spacing between Permaflectors should not exceed their height above the work plane.

Lamps—300-500-watt.

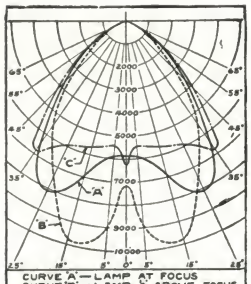
Holder—Furnished with 4-inch round box cover, Mogul Socket and special holder, as illustrated, for installation with 4-inch round or octagon outlet box.

Dimensions—

Height of Permaflector—9¾ in.
Diameter of Permaflector—16 in.

Permaflector No. I-1000

Designed particularly for industrial lighting where the lighting unit must be from 25 to 50 ft. or more above the floor, usually above the crane as well. Also for lighting through skylights. Very concentrating, most of the reflected light being confined to the zone 0° to 40°, with a cut-off at approximately 60°.



APPARENT CANDLEPOWER
DISTRIBUTION No I-1000
1000 WATT LAMP

Spacing between reflectors should not exceed their height above the work plane.

Lamps—300-500-750-1000-watt.

As illustrated, for 750 and 1000-watt lamps. For 300-500-watt lamps, lower the receptacle so that upper screw is located at lower arrow.

Holder — Mogul Socket and special holder furnished, tapped for ½-in. conduit.

Guard—Wire basket guard available, with bottom hinged for relamping.

Dimensions—

Height overall .....16¾ in.
Height of reflector..... 8⅛ in.
Diameter .....16 in.

Continued on next page

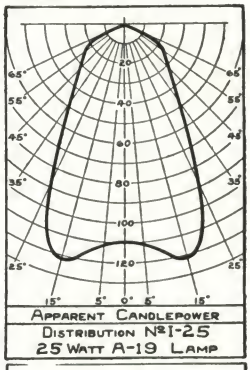
Permaflector No. I-25

This reflector is of the focusing type, of service whenever highly concentrated beam over a limited area is desired. Particularly designed for the lighting of the exterior of filling stations, with reflectors set at 45° angle under the eaves of the building. Also useful for theater service, indirect cove lighting and special applications where space is limited.

Lamps—15-watt A-19 or 25-watt A-19 (inside frosted).

Holder—2¼ in. Form "O."

Dimensions—
Height ..... 3 in.
Diameter ..... 4½ in.

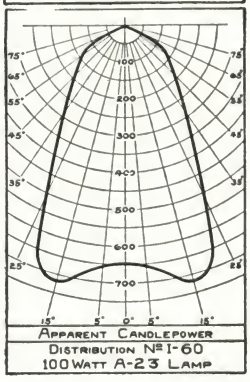


Permaflector No. I-60

Also a focusing type of reflector, designed for the same uses as No. I-25. Also of service for low mounting industrial use, where a localized overhead system is desired, as over benches, inspection tables, stock shelves, etc.

Lamps—60-watt A-21 or 100-watt A-23 (inside frosted).

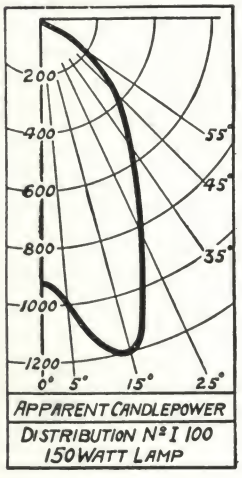
Holder—2¼ in. Form "O" for 60-watt. 2¼ in. Form "H" for 100-watt.



Color-Lite—Special Color-Lite available.

Dimensions—
Height ..... 4⅞ in.
Diameter ..... 6¾ in.

Flush Mounting Ring No. I-60—(See Permaflector Page 19.)



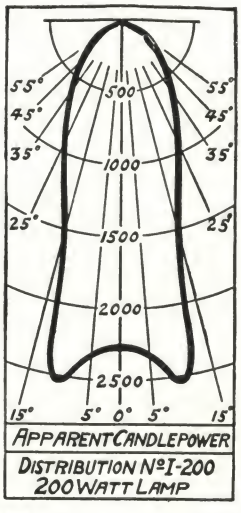
Permaflector No. I-100

Same as No. I-75, excepting it is for 100-watt A-23 and 100-150-watt clear lamps.

Lamp—100-150-watt clear with 2¼ in. Form "H" holder; 100-watt A-23 with 2¼ in. Form "O" Holder.

Dimensions—
Height ..... 5⅞ in.
Diameter ..... 9¾ in.

Flush Mounting Ring No. C-201—(See Permaflector Page 19.)



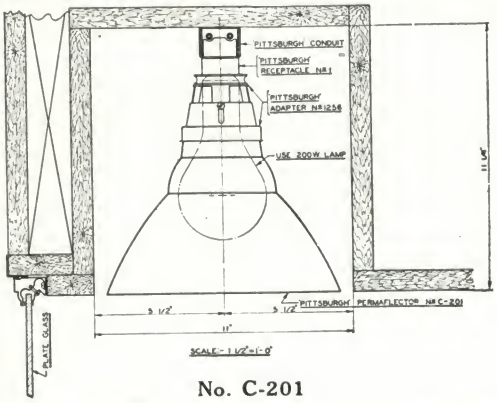
Permaflector No. I-200

A focusing type of reflector for use whenever a highly concentrated beam over a limited area is desired. Primarily a local lighting unit for intensifying the illumination of particular areas.

Lamp—200-watt.

Holder—2¼ in. Form "O."

Dimensions—
Height ..... 7⅜ in.
Diameter ..... 11 in.



No. C-201

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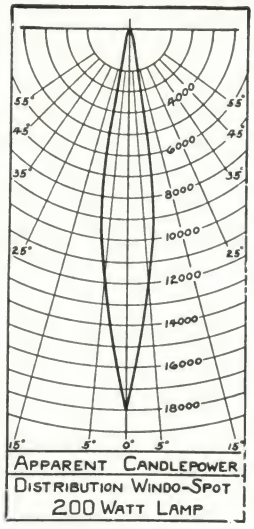
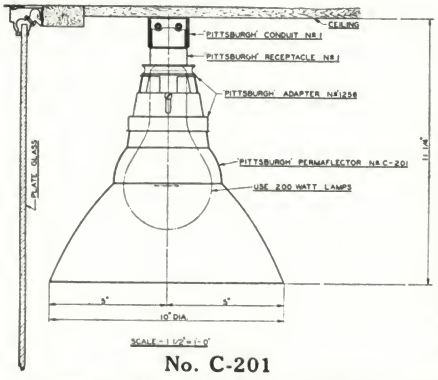


Permaflector No. T-1

For use with traffic lamps.
Lamp—60-watt special traffic.
Holder—2¼ in. Form "O."
Dimensions—
Height .....4 in.
Diameter .....8 3/16 in.

Permaflector No. C-201

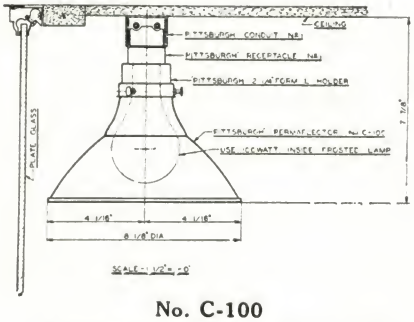
Also a spot type of reflector useful in high and extremely shallow windows—see chart for selecting proper Permaflector for windows (See Permaflector Page 7.) (This reflector is used in Windo-Spot No. 200.)
Lamp—200-watt.
Holder—2¼ in. Form "O."
Color-Lite—Special Color-Lite available.
Dimensions—Height (including No. 1 Adapter) 9⅜ in.
Diameter .....10 in.



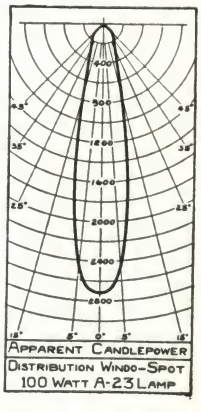
No. C-201

Permaflector No. C-100

A spot type of reflector useful in very shallow windows. See chart for selecting proper Permaflector for windows. (See Permaflector Page 7.) Also a local lighting unit for intensifying the illumination of particular areas. (This reflector is used in Windo-Spot No. 100.)
Lamp—100-watt A-23 or 150-watt clear.
Holder—2¼ in. Form "H" or our 2¼ in. Form "L" on Conduit No. 1, for A-23, 100-watt; form "LC" for 150-watt.
Color-Lite—Special Color-Lite available.
Dimensions—Height .....5 in.
Diameter .....8⅛ in.
Flush Mounting Ring No. C-201—(See Permaflector Page 19.) For trough mounting (see Permaflector Page 43); for flush mounting (see Permaflector Page 17).



No. C-100



Flush Mounting Ring No. C-100—(See Permaflector Page 19.) For trough mounting or flush mounting (see Permaflector Pages 16 and 17).

Permaflector No. E-500

Distributing type intended for intermediate mounting high intensity industrial service, mounting 12 to 25 ft. above the work plane; for the lighting of gymnasiums; and for flush mounting in ceiling in combination with Hinged Ceiling Roundel No. 2. (See Permaflector Page 20.)
Also useful for installation in Gothic and other designs of lanterns, in churches and public buildings.
Lamp—300-500-watt, clear or bowl frosted.
Holder—Form "M," with Mogul Socket and 4 in. round outlet box cover.
Ceiling Roundel—See page 20.
Dimensions—Glass, height ..... 9⅛ in.
Glass diameter .....11⅞ in.
Overall, height, including 4 in. outlet box.....14 in.

Continued on next page

Permaflector No. E-25

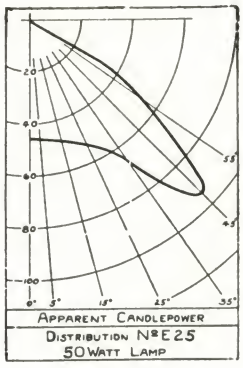
Distributing type for local lighting purposes.

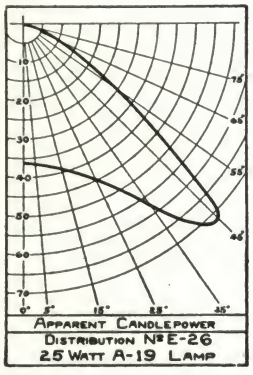
Flush Mounting Ring No. E-25—(See Permaflector Page 19.)

Lamp—25-watt A-19 and 50-watt A-21 (inside frosted).

Holder—2¼ in. Form "O" with 25-watt; Form "H" with 50-watt.

Dimensions—
Height .....3½ in.
Diameter .....4¼ in.





Permaflector No. E-26

A semi-distributing type for local lighting purposes.

Flush Mounting Ring No. 28—(See Permaflector Page 19.)

Lamp—25-watt A-19 (inside frosted) with holder 2¼ in. Form "O"; 50-watt A-21 (inside frosted) with holder 2¼ in. Form "H."

Dimensions—
Height .....3 7/16 in.
Diameter .....5⅝ in.

Permaflector No. E-75

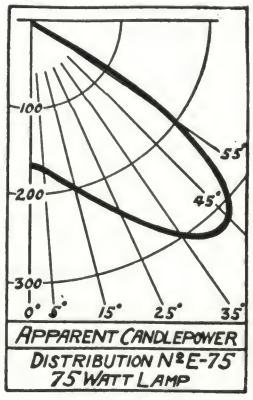
Distributing type for low mounting (5—12 feet above work plane), industrial general lighting service, for use in ornamental direct lighting fixtures such as Gothic lanterns in churches, and for use in flush mounting in low ceilings.

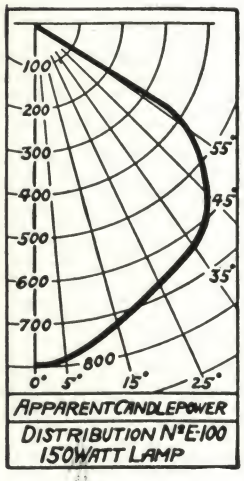
Flush Mounting Ring No. I-60—(See Permaflector Page 19.)

Lamp—100-watt A-23 (inside frosted) or 75-watt clear.

Holder—2¼ in. Form "H."

Dimensions—
Height .....4¾ in.
Diameter .....6½ in.





Permaflector No. E-100

Same as No. E-75, excepting for use with 100-watt A-23 and 100-150-watt clear lamps.

Flush Mounting Ring No. 55—(See Permaflector Page 19.)

Ceiling Roundel—(See Permaflector Page 20.)

Lamp—100-150-watt, clear with 2¼ in. Form "H" holder; 100-watt A-23 with 2¼ in. Form "O" holder. When equipped with "LC" holder, No. E-100 in combination with Hinged Ceiling Roundel No. 1 takes the 200-watt lamp.

Dimensions—
Height .....6⅛ in.
Diameter .....8½ in.

Continued on next page

Permaflector No. E-200

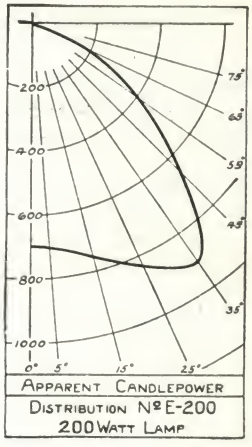
Same as No. E-75, excepting for use with 200-watt lamps.

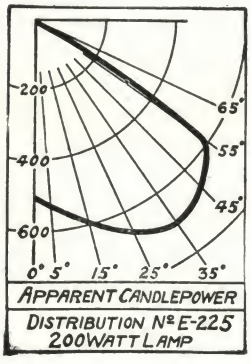
Lamp—200-watt.

Holder—2¼ in. Form "O."

Dimensions—
Height .....9 in.
Diameter .....9½ in.

Flush Mounting Ring No. E-200—(See Permaflector Page 19.)





Permaflector No. E-225

Semi-distributing, otherwise same as the No. E-200.

Lamp—200-watt.

Dimensions—
Height .....7¾ in.
Diameter .....9½ in.

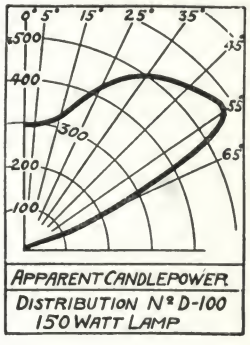
Flush Mounting Ring No. E-200—(See Permaflector Page 19.)

Permaflector No. D-100

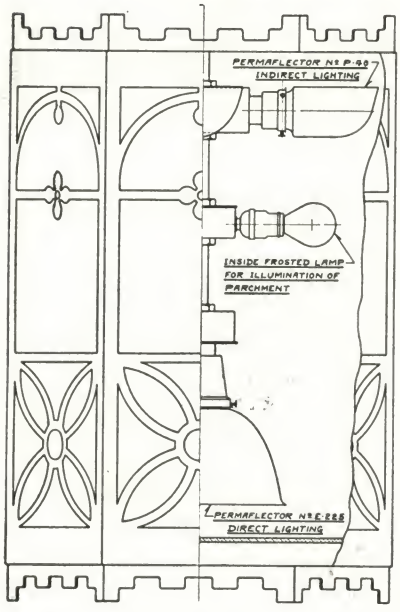
For use in indirect lighting fixtures with the lamp burning tip up.

Lamp—100-150-watt clear with 2¼ in. Form "H" holder; 100-watt A-23 with 2¼ in. Form "O" holder.

Dimensions—
Height .....4½ in.
Diameter .....7 in.



Permaflector No. D-200



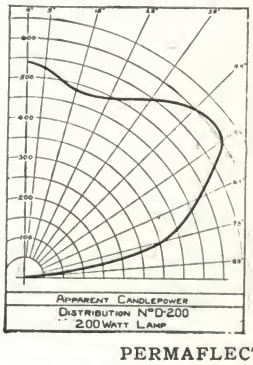
Typical Cross Section of Lantern Showing Application of Permaflectors

For use in indirect lighting fixtures, lamp burning tip up. The distribution of light is wider than that of No. D-100.

Lamp—200-watt.

Holder—3¼ in. Form "O."

Dimensions—
Height .....5¾ in.
Diameter ...9½ in.



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FLOODLIGHTING

Nearly two decades ago, a new form of display lighting was made possible through the development of floodlighting equipment employing incandescent lamps with a concentrated light source. The previously employed form of display lighting, small electric lamps outlining buildings or monuments, contributed but little to bringing out the form, contour, and architectural beauty of the building.

With the advent of floodlighting, it became possible to bathe an entire structure with light from distant points, thus simulating daylight and in many instances developing more interesting light and shade effects than with daylight.

Consequently, imposing structures such as large office buildings, banks, theaters, capitols and other public buildings were illuminated at night in this manner. At first white light alone was employed and many pleasing effects realized. Buildings so illuminated enjoyed unusual publicity and because of the publicity value, growth in the use of floodlighting was rapid and steady. While white floodlighting of a building exterior is a pleasing accomplishment, to "paint the exterior surface of a building with ever changing, blended hues of colored light, scintillating against the black dome of the night sky" is an achievement of the highest order in the night illumination of the exterior of buildings and monuments. In this development, the PITTSBURGH REFLECTOR COMPANY has been in the van of the march of progress. The first large skyscraper to be illuminated with Mobile Color was the Edison Building of the Philadelphia Electric Company, illustrated elsewhere herein.

This mammoth installation, employing over 500 Pittsburgh Floodlights, was turned on January 1st, 1928. It has been in constant operation since that time.

The two outstanding features of the installation are: (1) constantly changing color effects, according to a predetermined cycle, which repeats itself throughout the evening; (2) flexible floodlighting equipment which makes possible complete rearrangement of the color effects and change in the sequence of the color cycle.

With the Mobile Color lighting of the Edison Building, there came into use a new method of securing changing color effects. The Edison Building has two complete floodlighting installations: (1) a white floodlighting installation controlled by a cycle dimmer; (2) a second floodlighting system to provide the colored illumination.

The colored lighting remains on steadily while the floodlighting is in operation. The white lighting is controlled by a cycle dimmer which gradually brings the illumination from "black out" to full brightness and vice-versa, according to a prearranged cycle of operation. When the white lighting is extinguished, on a particular portion of the building, that portion of the building appears luminous in the color or combination of colors employed. As the white lighting gradually increases in intensity, it progressively dilutes the colored lighting, thus presenting to the eye lighter and lighter tints of the color or combination of colors employed. When the white lighting is on full brightness, it completely overcomes the colored lighting and the building appears in white. As the white lighting begins to subside in intensity, the building again comes up in color, beginning with the very lightest tints which gradually deepen to the full depth of the color as the white lighting is completely "dimmed-out."

This "wash" method of providing Mobile Color has the distinct advantage of employing to the full the advertising value of changing colors in combination with the advertising value of high intensity white illumination at intervals. A far greater variety of effects is obtainable than by the method where colored lighting only is employed, each color being controlled by a cycle dimmer. Not only is the building brought up periodically in white lighting and in deep rich hues of colored lighting, but also in the innumerable intermediate tints.

Another very attractive installation of Mobile Color lighting followed the installation of the Edison Building by about six months. It is the John H. McClatchey Building, 69th Street and West Chester Pike, Philadelphia, Pennsylvania. The design of the building is modernistic. The exterior surface of the building is beautifully colored semi-glazed terra-cotta. A set-back occurs at the third floor level and this immediately suggested the application of Mobile Color floodlighting to the upper part of the building, but since this is only 12 ft. in height and consists of a single surface, something different and more elaborate had to be employed than in the case of the Edison Building with its three distinct set-back surfaces. In the case of the Edison Building variety is obtained by the simultaneous use of three or more colors on the various surfaces of the building. In the case of the McClatchey Building it was obvious that variety would have to be secured by the use of a number of different colors and color combinations in sequence on the single surface to be floodlighted.

It was also decided that a horizontal band of Mobile Color across the top of the building, standing by itself, would not be a good effect from the advertising standpoint nor from the aesthetic. Therefore, two-story art glass pilasters are incorporated in the design. At 1-ft. intervals two Pittsburgh Permaflectors No. P-76, attached to Pittsburgh Conduit No. 2-A running the full length of each pilaster and equipped with 60-watt lamps, reflect their light to a white plaster surface and the reflection from the white plaster surface makes the art glass pilasters uniformly luminous throughout their length.

To complete the illusion of support from the ground up, for the third floor Mobile Color illuminated section, a projector in the top of each art glass pilaster directs a finger of light upwards to the golden eagle at the third floor level.

Continued on next page

FLOODLIGHTING (Continued)

The Mobile Color installation consists of six complete floodlighting systems: (1) red, (2) amber, (3) green, (4) moonlight blue, (5) royal blue, (6) uncolored or white. The white lighting is connected in circuit with a cycle dimmer of the resistance type. The five colored light circuits are controlled by means of remote control magnetic switches, the operations of which are properly synchronized with the operation of the cycle dimmer. This control apparatus, known as "Mobilite," is a new development of our organization and available only for Permaflector installations.

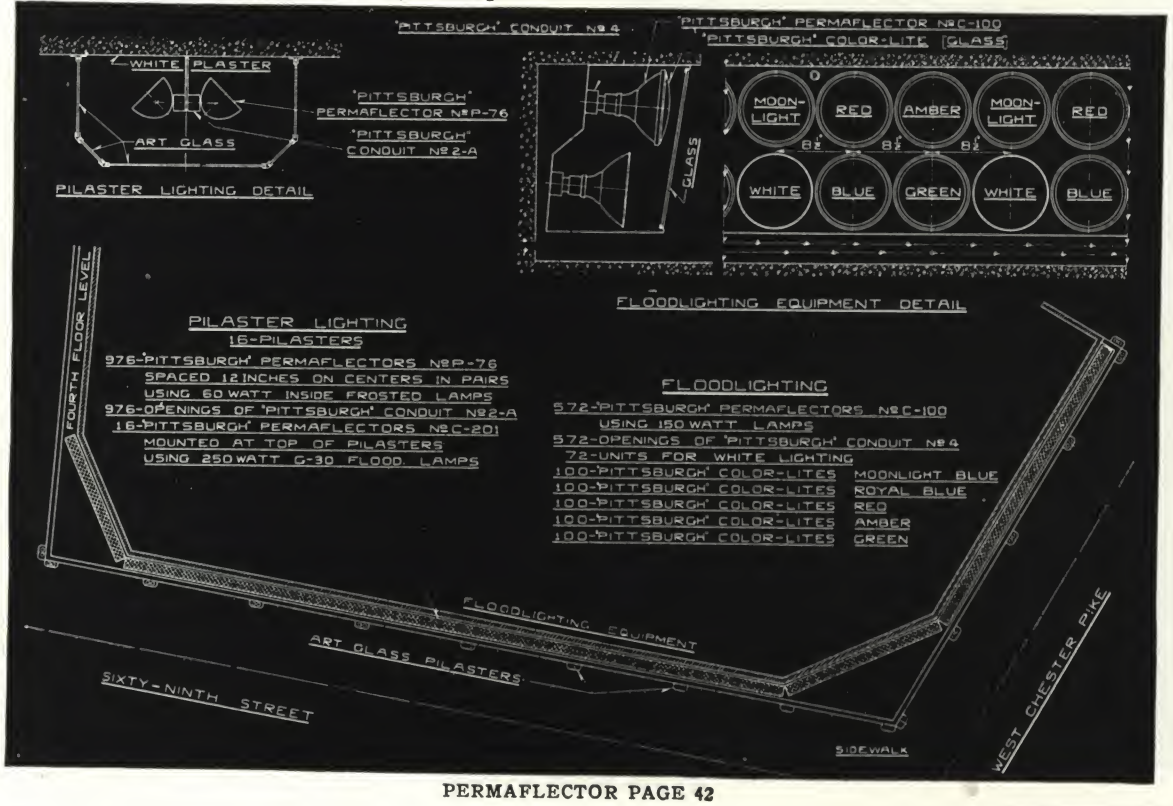
Another very interesting installation is the Berks County Trust Company, Reading, Pa., illustrated herewith. It is a somewhat simpler installation than the McClatchey Building and hence will serve better to illustrate the manner in which "Mobilite" provides a sequence of changing color and occasional white lighting according to a predetermined cycle.

The installation of Mobile Color floodlighting on the Berks County Trust Company consists of three complete floodlighting systems: (1) red, (2) blue, (3) white, or uncolored. The floodlighting equipment for illuminating the front elevation is concealed in the balconies of the second floor level where the Permaflector equipment is installed in a metallic housing constructed of sheet copper, equipped with plate glass weatherproof cover and ventilated. The side elevation of the building, for a distance of 50 ft. from the front, is illuminated by means of Permaflector equipment installed in a sheet metal extension of the cornice at the second floor level. Since only the first 50 ft. of the building can be seen from the street, it was not deemed advisable to illuminate back any further than that amount.

McClatchey Building in Daytime

At Left:
Permaflectors Back of the Colored Glass in Pilasters
At Right:
Permaflectors for the Flood Lighting

Below:
Details of Lighting of McClatchey Building



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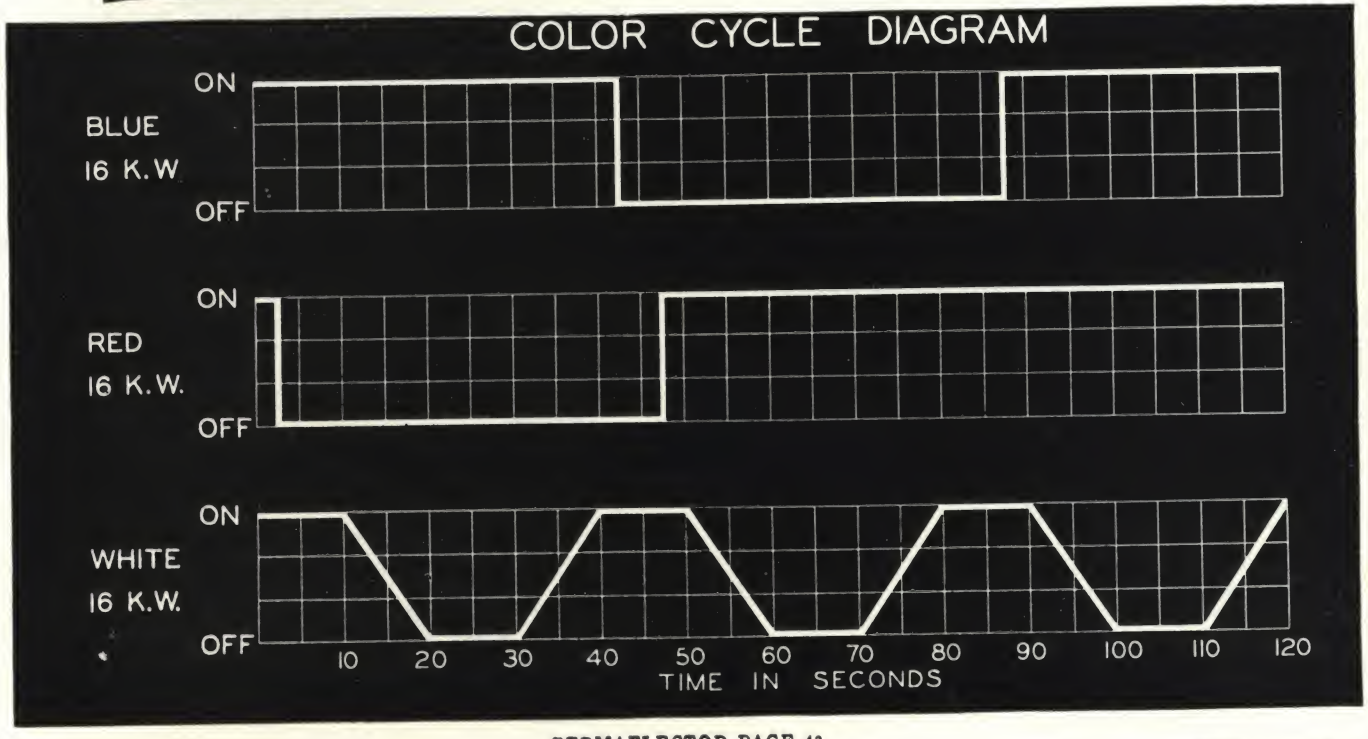
FLOODLIGHTING (Continued)

In the basement of the bank building is installed "Mobilite" (see Permaflector Page 47), the electrical distribution and control apparatus. This is an all-electrical controller consisting of cycle dimmers for the control of the white floodlighting system, and magnetic contact switches properly synchronized with the operation of the cycle dimmers for controlling the colored lighting. Twelve changes take place in each two-minute interval and this operation is continuous while the floodlighting is turned on.

Examination of the color cycle diagram illustrated herewith will indicate that the building comes up in white, periodically in full depth of red, full depth of blue, full depth of red and blue combined, making purple, and while the white lighting is either increasing or decreasing in intensity, the various tints of these colors are produced. Whenever the white lighting is on full intensity, the color is "washed out" and changes are made, the predominance of the white lighting masking these changes. A complete cycle of operations requires two minutes and in these two minutes the building appears in white for three intervals of ten seconds, in color for three intervals of ten seconds, and in changing color for six intervals of ten seconds each.

"Mobilite" is the only all-electrical control apparatus available for providing Mobile Color lighting by the "wash" method, that is to say, by the method of changing colors by controlling the white lighting with cycle dimmers and the colored lighting by magnetic remote control switches operated by contactors synchronized properly with the operation of the cycle dimmers. This "Mobilite" controls lighting in changing colors, presents the maximum in variety. Not only are the buildings illuminated with this system brought out in full deep colors, periodically in white, but in addition, almost an infinite number of tints, from full deep colors to complete "wash-out," are presented to the astonished and admiring gaze of the public.



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FLOODLIGHTING (Continued)

Two Units FLC-100

Permaflector Floodlight FLC-100

Designed for lighting vertical surfaces of the height of 12 ft. or less, from equipment close to base of such vertical surfaces. Designed for use with 100-watt A-23 inside frosted lamp. Four standard colors: red, amber, green, blue are available.

Consists of galvanized iron channel, to which are attached individual conical spun copper drums, containing Pittsburgh Receptacle No. 1, Permaflector I-60, 8-in. color glass roundel (Color-Lite F-2) and 8-in. clear heat-resisting cover glass as shown above.

Channel must be supported by means of special strap iron brackets.

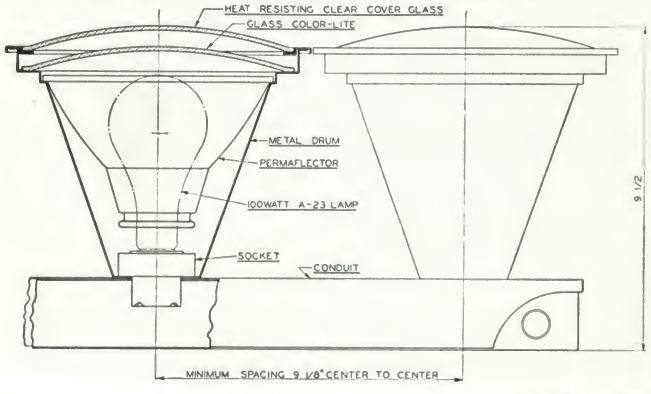
Furnished in units as shown. Units may be ordered on any desired spacing: minimum 9⅛ in. on centers.

Permaflector Floodlight No. FLC-104

Same as No. FLC-100, excepting that it is larger to accommodate 200-watt lamp. Minimum spacing 11 in. on centers. Height over all, 12¾ in. Employs a new Permaflector (No. C-101), a 9½-in. colored glass roundel (Color-Lite F-4) and 9½-in. heat-resisting cover glass.

Floodlight FLC-104, because of its higher wattage capacity, may be employed for illuminating vertical surfaces of a height of 20 feet from a location close to the base of such surfaces.

Neither FLC-100 or FLC-104 may be employed for other than upward lighting of vertical surfaces.



Permaflector Floodlight No. FLC-250

A very concentrating floodlight, designed for use with the 250-watt G-30 floodlighting lamp. Particularly useful for floodlighting buildings from locations on the building itself, such as cornices, setbacks, etc., where space is limited and for intermediate throws. Serves essentially the same purpose as FLC-501 but for shorter distances and smaller areas.

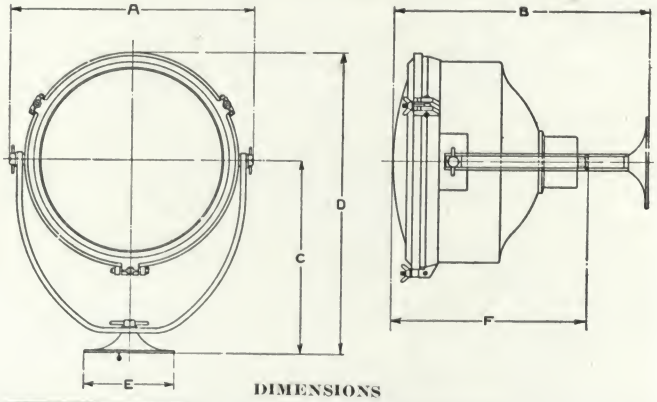
Similar to No. FLC-501, in construction and materials, excepting case is entirely of Armco sheet metal, galvanized.

Cover with heat-resisting glass is hinged, held under pressure against asbestos gasket by three spring clip fasteners.

Beam spread, 16 degrees; lamp, 250 watts G-30; beam lumens, 1374; candle-power maximum at center of beam, 70,750.

Glass Color-Lite No. F-1 in four colors, red, blue, green and amber, available. These Color-Lites are installed inside of heat-resisting cover glass.

Lamp—250-watt G-30 floodlighting. (Base down only.)



DIMENSIONS

No.	A	B	C	D	E	F
FLC-501	21″	25″	16″	25½″	8″	19″
FLC-1001	21″	27″	17″	27″	8″	23″
FLC-250	15″	17″	13¾″	20″	6″	14″

All floodlights, except FL-750, furnished with clear cover glass unless otherwise specified. If stippled or spread lens is desired, order must so state. Floodlight FL-750 furnished only with stippled cover glass.

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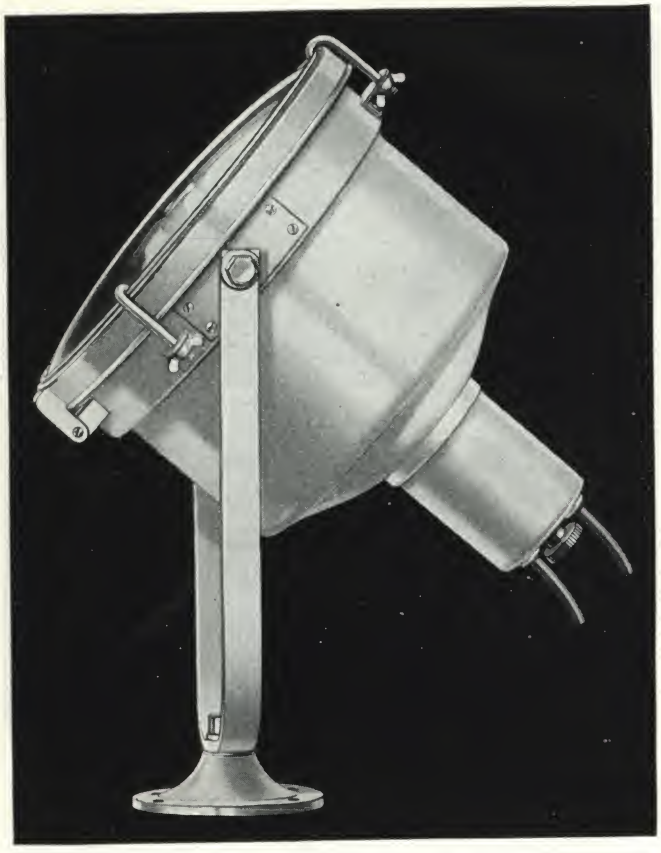

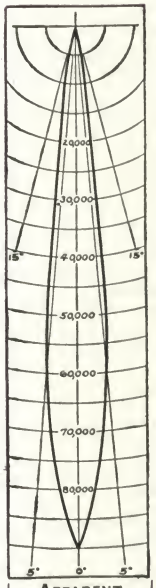

APPARENT CANDLEPOWER DISTRIBUTION No. FLC-500 500-WATT LAMP

Permaflector Floodlight No. FLC-501 —"The Tower Lighting Unit"

Consists of a cast-iron base, Armco sheet metal housing for lamp and reflector galvanized inside and outside and painted aluminum color, cast-iron cowl containing focusing-mechanism, heat-resisting glass cover cemented in hinged cast-iron door, and silver-plated glass Permaflector No. F-1001.

The excessive heat developed by the 500-watt lamp makes colored glass covers impracticable. Moreover, when changes in color of light are desired, considerable difficulty is experienced in changing the colored glass covers, which must be water tight.

No. FLC-501 is designed especially to accommodate the color caps (No. F-3, Permaflector Page 21) which are readily slipped over the lamp bulb. This eliminates the question of breakage of the color medium since the color caps are thoroughly protected from the weather by the outside clear heat-resisting glass cover.

This floodlight therefore provides a most practical means of securing color effects in floodlighting of buildings, monuments, etc.

Lamps—Floodlight No. FLC-501 is designed for use with the 300 or 500-watt standard Mazda C Lamp.

"Permaflector" Floodlight No. FLC-1001

Same as No. FLC-501, excepting different reflector and longer cowl. For 750-1000-watt lamp. Takes Color Cap (No. F-3, Permaflector Page 21).

"Permaflector" Floodlight No. FLC-300

This new floodlight meets the demand for a concentrating unit for use with the 300-watt general service incandescent lamp. Light distribution is similar to that of floodlight No. FLC-250, No. FLC-501, and No. FLC-1001.

It is intended primarily for the same class of service as the above mentioned floodlights, namely, the illumination of buildings from locations on the buildings themselves such as cornices, set-backs, etc.

No. FLC-300 is designed to accommodate Color-Lite No. F-5 which is a pressed Roundel 12 in. in diameter. It snaps into three clips over the top of the Permaflector, under the protection of the heat-resisting glass cover. Color-Lite No. F-5 is available in red, amber, green, and blue.

Floodlight No. FLC-300 is constructed entirely of Armco sheet steel metal, Parkerized. Base is of cast iron and bow of steel.

All moving parts, adjustments, screws, etc., are of brass as proof against erosion and freezing.

"Permaflector" Floodlight No. FLC-1002

This is a new floodlight especially designed for use with the 1000-watt G-40, 115-volt, clear bulb, floodlight lamp. The use of this lamp in a floodlight makes possible greater concentration of light than can be secured with the 1000-watt general service PS-52 lamp. Hence, Floodlight FLC-1002 serves the purpose of exceptional long range service.

Floodlight FLC-1002 is practically identical with FLC-501. The only difference is in the focusing mechanism which is adjusted so as to permit the use of this spherical bulb lamp having a short light center.

This floodlight is especially serviceable for illuminating the long distance shots of golf driving ranges.

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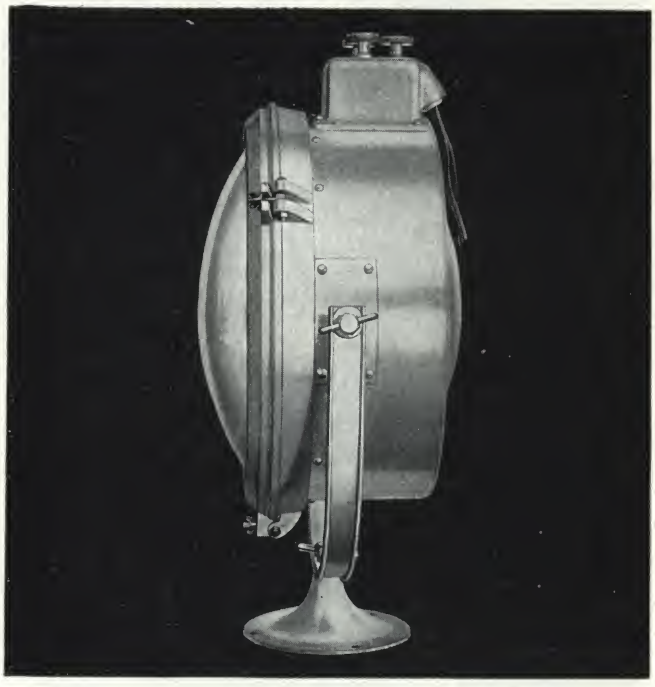
FLOODLIGHTING (Continued)



"Pittsburgh" Floodlight No. FL-500

Focusing—Three adjusting screws allow the lamp to be raised or lowered, moved from side to side, from front to back or back to front providing for perfect control of lamp in either plane. Permits rapid change of beam spread from 7½° to 30°. All moving parts, adjustments, screws, etc., are of brass and proof against corrosion and freezing.

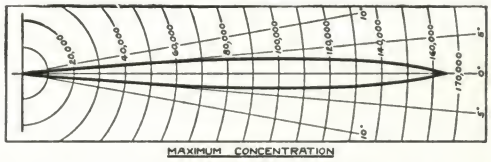
Housing—Cast iron base, door, door frame and cowl with drum of heavy Armco iron, galvanized. Door equipped with heat-resisting clear glass, cemented in, waterproof.

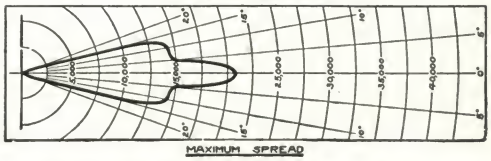
Cowl—Carries socket and adjusting mechanism.

Finish—Exterior of floodlight finished in satin silver color.

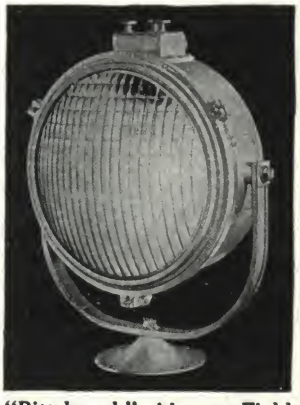
Reflector—Especially designed Permaflector 16 in. in diameter. Finished in satin silver color.

Lamp Size—300-500-watt.





Apparent Candlepower—Distribution No. FL-500 500-Watt Lamp



"Pittsburgh" Airport Field Flood
The No. FL-1500 equipped with dioptric lens

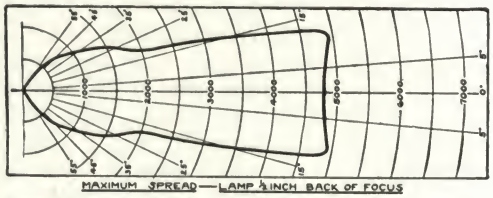
"Pittsburgh" Floodlight No. FL-300

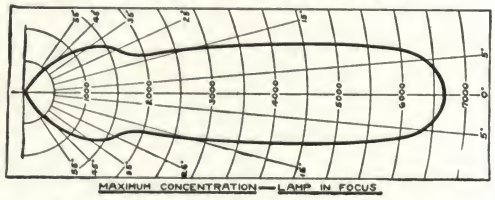
Comparatively broad light distribution for short distance floodlighting. Reflector fluted to smooth out the field of light. Designed particularly for mounting relatively close to the surface to be illuminated—approximately 10 to 20 feet therefrom, such as upon lighting standards at the curb. It may be feasible to locate at greater distance than indicated above. Whenever possible, floodlighting problems should be referred to "Pittsburgh" Engineering Department for recommendations.

When lamp is at focal center, maximum concentration is secured, the width of the important part of the beam being 30°. With the lamp ½ in. back of focal center, maximum spread is secured, width of beam being approximately 50°.

Description of housing, cowl, finish and reflector same as for No. FL-500.

Lamp—300-watt Type "C." 200-watt may be used with proper socket reducer.





Apparent Candlepower—Distribution No. FL-300 300-Watt Lamp

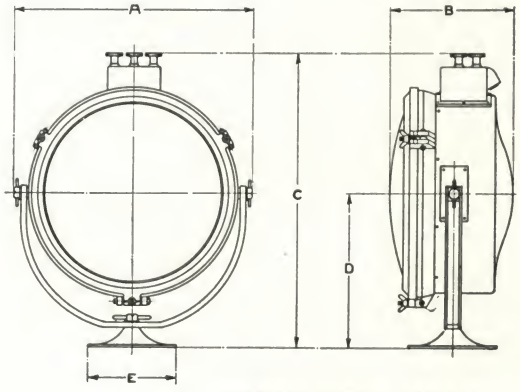
Floodlight No. FL-1500

Same as No. FL-500, excepting it is larger and contains a different reflector with more concentrating distribution, and for larger lamps.

Lamp Size — 750-1000-watt.

Floodlight No. FL-750

Same casing as used with FL-500 but contains broad beam reflector in which 750-1000-watt lamps may be used. Distribution midway between FL-300 and FL-500. Furnished with stippled glass cover only.



Concentrating Reflector

FL-300 may now be had equipped with unfluted Permaflector for applications where more concentration is desired. No color-lite available for use with this Floodlight.

DIMENSIONS

No.	A	B	C	D	E
FL- 300	15¾″	10½″	22¼″	12″	6″
FL- 500—FL-750	21″	12″	28¼″	16″	8″
FL-1500	24½″	12½″	30″	17″	10″

PERMAFLECTOR PAGE 46

Continued on next page

Floodlight FL-301

Floodlight FL-301, similarly to FL-300, has comparatively broad light distribution for short distance floodlighting. Reflector is fluted to smooth out the field of light. It is designed particularly for mounting relatively close to the surface to be illuminated, approximately 10 to 20 ft. therefrom, such as upon lighting standards on the curb. It may be feasible to locate at a greater distance than indicated above. One popular application is in the floodlighting of gasoline filling stations.

This is a companion floodlight to FLC-300. Similarly, it is constructed of Armco sheet metal, parkerized. Base is of cast iron and bow of steel. All moving parts, adjustments, screws, etc., are of brass and proof against erosion and freezing.

Similarly to FLC-301, it may be fitted with Color-Lite F-5 under the protection of the heat-resisting cover glass. Color-Lite F-5 is available in red, amber, green, and blue.

Floodlight FL-301 now may be obtained equipped with an unfluted Permaflector, providing more concentrated illumination where same is desired.

Heat-Resisting Cover Glass

Consists of special heat-resisting, clear convex glass, well annealed so that breakage caused by rain, sleet or snow is practically eliminated. Furnished as standard equipment with all Permaflector Floodlights, except FL-750 which is furnished only with stippled cover glass.

Cover Glass No. 1 for Floodlights Nos. FL-500, FL-750, FLC-501, FLC-1001 and FLC-1002 (16¾ in. diameter).

Cover Glass No. 3 for Floodlight No. FL-1500 (18¾ in. diameter).

Cover Glass No. 2 for Floodlight No. FL-300 (12 in. diameter).

Cover Glass No. 4 for Floodlight No. FLC-250 (11¼ in. diameter).

Cover Glass No. 5 for Floodlights FL-301 and FLC-300 (13¾ in. diameter).

Stippled Cover Glass—For Floodlights Nos. FLC-250, FL-500, FL-750, FL-1500, FL-300, FLC-501, FLC-1001 and FLC-1002. Useful for smoothing out the field of light for short throws. Furnished with Permaflector Floodlights only when order so specifies.

Spread Lens

For Floodlights Nos. FL-300, FL-500, FL-1500, FLC-250, FLC-501 and FLC-1001.

The "Pittsburgh" Spread Lens flattens the beam of light from the floodlight into a rectangular band of 60° width similar in action to the automobile headlight lens. Particularly useful for lighting rectangular signs from rather close locations.

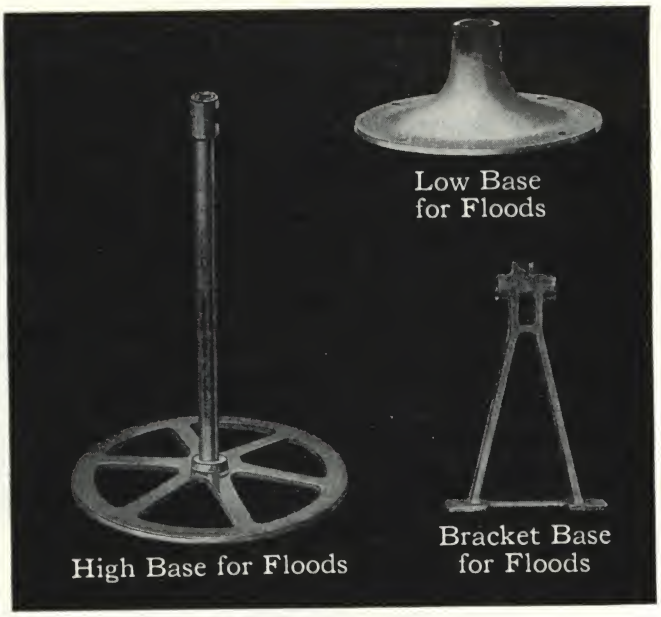
When ordering specify if beam is to be spread horizontally or vertically.

Furnished with Permaflector Floodlights only when order so specifies.

Floodlight Reflectors

For FL-500. Diameter 16 in.
For FL-750. Diameter 16 in.
For FL-1500. Diameter 18 in.
For FLC-250. Diameter 10 in.
For FL-300. Diameter 12 in.
For FLC-501. Diameter 16 in.
For FLC-1001. Diameter 16 in.
Reflector is C-201, Permaflector Page 38.

Unless otherwise specified when ordering, all floodlights will be furnished with clear cover glass.



Bases

Low base for Nos. FL-500, FL-750, FL-1500, FLC-1001 and FLC-501. Weight 4 lb.

Round base for No. FL-300, illustrated on page 46.

Bracket base for Nos. FL-500, FL-750, FL-1500, FLC-1001 and FLC-501 (used either upright or horizontal).

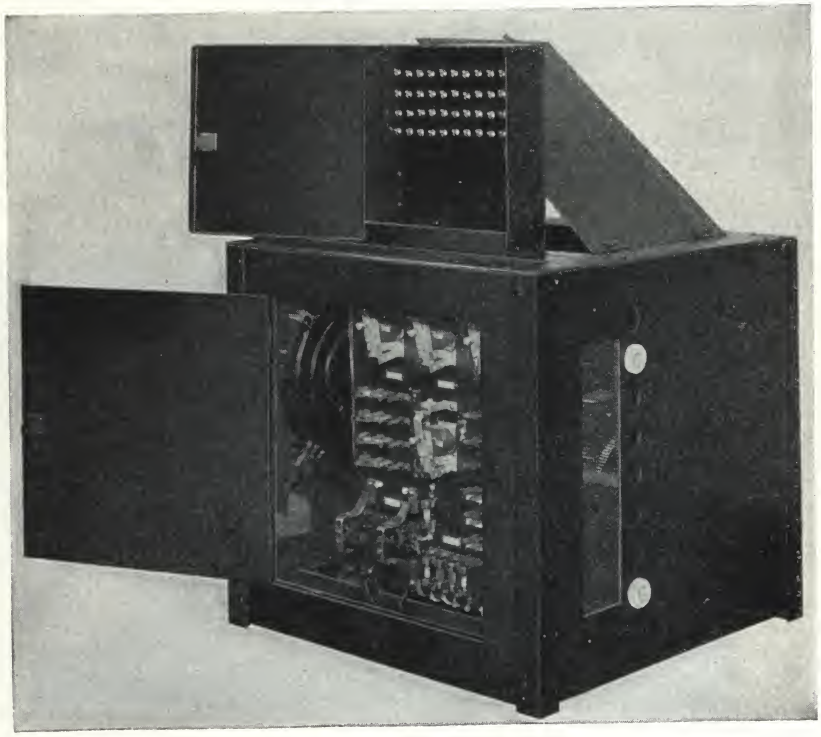
High (portable) base for Nos. FL-500, FL-750, FL-1500, FLC-1001 and FLC-501 36 in. high. Weight 15 lb.

"Mobilite"
(Patented)

"Mobilite" is the only all-electrical control apparatus for providing Mobile Color lighting of buildings or show windows by the wash method.

The distinctive feature of this machine is the manner in which the operation of cycle dimmers are synchronized with the operation of magnetic remote control switches.

This machine makes possible the washing out of colors by gradually bringing up the white lighting from "black out" to full brilliancy and switching from one color to another under the mask of the white lighting, as more fully described on page 43.



"Mobilite" for Mobile Color Floodlighting

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TAKE ADVANTAGE OF OUR COMPLETE LIGHTING SERVICE

For more than twenty years we have specialized in all forms of lighting for which the silver-plated glass reflector is particularly suited. We have accumulated a fund of information that is valuable to architects, engineers, and others having problems of this nature who have not had this varied experience. This information is at your service, without obligation, on all problems relating to the lighting of show windows, color lighting, spot lighting, cove lighting, as well as direct and indirect lighting, outdoor floodlighting, etc. The catalogue and booklets listed below will be found very interesting as well as useful in connection with their particular subjects. Copies will be sent free on request. Check the subjects in which you are interested:

Book on Floodlighting

The Permaflector Engineering Department has prepared a 64-page book discussing in detail various phases of floodlighting, including floodlighting in colors and in changing colors. The book is profusely illustrated, showing a wide variety of typical floodlighting installations—specific information on calculating floodlighting installations—how to decide the intensity of illumination required; how to select the floodlight locations; how to select the most suitable type of floodlights; how to decide the beam spread required; how to select the type and size of lamp; and how to determine the number of floodlights required.

Permaflector Catalog No. 33

Issued in June, 1930. This catalogue is practically a reprint of the pages here in SWEET'S ARCHITECTURAL CATALOGUES—a very complete book on illumination problems, illustrating and describing the complete Permaflector line. In bound form; size, 8½x11 in.—suitable for your files.

Permaflector Lighting Magazine

This 28-page magazine (8½x11 in.) is published eight or ten times a year, each issue being devoted to one subject. All architects who receive SWEET'S ARCHITECTURAL CATALOGUES are on the mailing list to receive this magazine as published. If you do not receive it, or wish additional copies, please write. Back issues available are as follows:

Church Lighting
Automotive Lighting
Bank Lighting
School and College Lighting
Floodlighting
Theater Lighting
Retail Store Lighting (other than show windows)

Other Permaflector Publications Available

Lighting Through Skylights—Henry Art Gallery, Seattle, Wash.
What Engineers Found Out About Show Windows
Play Football at Night

PITTSBURGH REFLECTOR COMPANY

304 Ross St., Pittsburgh, Pa.

Continued on next page

Spectacular Color Lighting

The wide variety of applications of Permaflector Floodlights is well described and illustrated in the Floodlighting issue of the Permaflector Lighting Magazine; one application in which architects are at times particularly interested is the color lighting of scenic features.

The colored pictures on this page give only a faint idea of the beautiful effects that may be secured through the use of Permaflector Floodlights and Color-Lights.

This particular installation was made for the recent Garden Club festival at Seattle, a section approximately 1000 feet by 600 feet of Volunteer Park being turned into a gigantic garden at night through the use of Permaflector Floodlights and Permaflector Color Lights.

The Copper Birch Group, shown above, "keys" the entire lighted section. The Golden Cedar under the color lighting looks like a Heliotrope in full blossom; the Copper Birch in back of it, like a huge red Salvia; and the towering Poplar resembles a bouquet of dark red Wallflowers with green foliage.

The Golden Cedar is painted in blue light through the use of four Permaflector Floodlights FLC-250. The Copper Birch, having a red tinge on the top of its leaves and green on the back, turns a vivid red under the three Permaflector FLC-1001 units with red color cap. The Poplar tree, sixty feet high, is painted in green with just a fringe of red at the top. A few Spruces are painted with blue light, Cedars of various kinds in red, and here and there a combination of red and green on a group of trees shows red with yellow highlights.

So attractive is this gigantic garden that as many as five thousand people are visiting the park each night to view the display.

This idea of transforming private grounds and public parks into gigantic gardens at night, blazing with light and color, is one that will appeal to many.

Another application of the same idea is at Ladder Creek, at the Skagit Power Development of the Lighting Department, City of Seattle.

Dropping off the mountain is a series of falls in a primeval forest setting. Huge trees line the banks; and granite boulders here and there break the rushing waters into foam.

The huge rocks stand out in the darkness revealed by the white floodlighting; here the falling water is of rainbow hues — and there, liquid fire dashing down into bowls of gold. Back in the glens, mysterious spots of color — blue lights playing on jutting rocks, spruces given added charm by blue light, red cedars in red light, and here and there a combination of colors painting groups of trees red and yellow.

Permaflector engineers will be very glad to discuss this form of scenic lighting with anyone who may be interested.

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